### **SECTION 8.1 INTRODUCTION**

The Public Safety Element of the *Rolling Hills Estates General Plan* emphasizes the need for a citywide approach for emergency preparedness and hazards prevention. The implementation of the Public Safety Element programs and policies will reduce the potential for injury, damage and disruption due to both natural catastrophes and man-made hazards. The Public Safety Element establishes safety standards and programs designed to protect life and property.

As a State-mandated element, the Public Safety Element fulfills the requirements of Section 65302(g) of the California Government Code and the State Planning and Zoning Law. The Element sets goals and policies which address public safety issues of concern in the City. The Element provides the basis for a public safety plan, identifying standards and programs to protect public safety and outlining adequate facilities and services to meet the emergency needs of the City. Finally, the Element contains a comprehensive program to deal with the different hazards and disasters which may occur in the planning area.

The Public Safety Element also includes an inventory of both natural and manmade hazards such as earthquakes, flood plains, landslides, geologic hazards, urban and wildfire, and hazardous materials/wastes. In dealing with these issues, it is prudent to consider prevention as the first step in hazard mitigation where it is possible. This is accomplished by elimination of the hazard, isolation/avoidance of the hazard, or the regulation of land uses and structures in known hazard areas. Emergency planning involves the formulation of strategies to minimize human injury, property damage, and economic and social disruption. Emergency preparedness also focuses on those measures necessary to return the functions of the City to normal conditions soon after a disaster.

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### **SECTION 8.2 GOALS AND POLICIES**

The Public Safety Element establishes goals, standards and programs to protect life and property. Potential hazards due to the area's geology, seismic hazards, urban and wild fire potential, dam inundation and flooding potential, hazardous materials contamination, and crime are also addressed in the following policies. The goals and policies of the Public Safety Element call for the development of emergency plans and procedures in case of a community-wide disaster and the elimination of hazards in the planning area.

#### **Issue: Critical Facilities**

Critical facilities refer to those facilities occupied by dependent populations (hospitals, schools, etc.) and those that are designed to protect public health and safety. It is important that critical facilities remain functional during disasters and emergencies so that they may continue to serve the rest of the City.

- Goal 1: To the fullest extent possible, the City will work with the County to ensure that critical structures remain safe and functional in the event of a disaster.
- **Policy 1.1** Ensure that existing critical and semi-critical structures throughout the City meet seismic safety standards within ten years and that new facilities are developed to upgraded standards.
  - **1.1.1 Implementation Measure:** The City will work with Los Angeles County Building and Safety Department and other agencies in ensuring that all proposed structures in the City meet current seismic safety code requirements.

Timing. Immediate and ongoing Agency: Planning Department

Funding: General fund

- Policy 1.2 Designate and develop specific critical facilities as emergency centers to serve the entire City and work with other Cities to maintain existing trauma care facilities that serve the region.
  - **1.2.1 Implementation Measure:** The City will meet with other communities in the region to discuss the loss of trauma care centers in the region. The City will examine the feasibility of establishing the development of a critical/trauma care unit at one of the local clinics or hospitals in the region. The City will consider the establishment of such a facility as part of the discretionary review of future development proposals involving clinics, hospitals, or medical offices.

Timing: Immediate and ongoing

Agency: City Manager Funding: General Fund

- **Policy 1.3** Work with the County to ensure that all fire equipment remains operable and adequate to respond to a major disaster.
  - **1.3.1 Implementation Measure:** The City will work with the Los Angeles County Fire Department to ensure that fire protection services are maintained at adequate levels. City staff will monitor the City's fire protection rating and cooperate with the Fire Department in the correction of deficiencies.

Timing: Immediate and ongoing

Agency: City Manager Funding: General Fund

## Policy 1.4

Cooperate with the Los Angeles County Sheriffs Department to ensure that law enforcement services are ready and available to serve the City in the event of a major disaster.

**1.4.1 Implementation Measure:** The City will work with the Los Angeles County Sheriffs Department to ensure that law enforcement services are maintained at adequate levels. City staff will monitor the City's contract and budget with the Sheriffs Department to ensure that adequate service levels are maintained.

Timing: Immediate and ongoing

Agency: City Manager Funding: General Fund

#### Policy 1.5

Support earthquake strengthening and provision of alternative or backup services, such as water, sewer, electricity, and natural gas pipelines and connections, especially in areas of high seismic or geologic high hazard or where weak segments are identified by existing or future studies.

**1.5.1 Implementation Measure:** The City will identify those active and potentially active fault traces as for special study. Future development within the areas will have to provide geotechnical studies indicating the location of the fault trace to proposed improvements and identify appropriate mitigation. The City will evaluate the seismic risk to existing

infrastructure in these areas and where appropriate, examine the feasibility of mitigating the risk over time.

Timing: 1993 for initiating study

Agency: Planning Department and Public Works

Funding: General Fund

### Policy 1.6

Enforce seismic design provisions for Seismic Zone 4 of the Uniform Building Code to ensure adequate review and inspection to ensure that stairways and elevators are adequately strengthened and nonstructural components such as emergency generators, water beaters, computers, and cabinets are securely anchored in critical facilities.

**1.6.1 Implementation Measure:** The City will work with Los Angeles County Building and Safety Department and other agencies in ensuring that all proposed structures in the City meet current seismic safety code requirements.

Timing. Immediate and ongoing

Agency: Planning Department/Public Works

Funding: General Fund

### Policy 1.7

Require fault investigations along traces of the Palos Verdes and Cabrillo faults to comply with guidelines implemented by the Alquist-Priolo special Studies Zone Act. Buildings for human occupancy should be setback a minimum of 50 feet from those faults that are shown to be active or from fault traces where the risk cannot be determined.

**1.7.1 Implementation Measure:** The City will continue to use the Uniform Building Code and update as necessary to ensure seismic safety.

Timing: Immediate and ongoing

Agency: Planning Department/Building & Safety Dept.

Funding: General Fund

- **Policy 1.8** Require review by a structural engineer when a critical building or facility undergoes substantial improvements.
  - **1.8.1 Implementation Measure:** City staff will review existing ordinances to ensure that the appropriate review requirements are included within them. In addition, the Seismic

Safety Ordinance will require a structural engineer to review development proposals within designated Special Studies Zones.

Timing: Immediate and ongoing

Agency: Planning Department/Public Works/Building & Safety Dept.

Funding: General Fund

**Policy 1.9** Require site specific geotechnical analysis in areas of potential liquefaction, especially in and adjacent to the Chandler landfill.

**1.9.1 Implementation Measure:** Future development within areas designated as having a liquefaction risk will be required to evaluate and mitigate the risk prior to development via the environmental review process.

Timing: Immediate and ongoing

Agency: Planning Department/Building & Safety Dept.

Funding: General Fund

## **Issue: Future Development**

The City can prevent the creation of additional hazards in the planning area through the review of proposed developments, making sure that they are not exposed to existing hazards and do not create new ones to adjacent land uses.

- Goal 2: Require that the City's Planning and Engineering Departments to review projects future development in the City.
- **Policy 2.1** Discourage development which is adjacent to earthquake faults and other geological hazards.
  - **2.1.1 Implementation Measure:** All development will comply with the Seismic Hazards Overlay Zone.

Timing: Immediate and ongoing Agency: Planning Department

Funding: General Fund

**Policy 2.2** Prohibit residential development on non-engineered fill of any kind.

**2.2.1 Implementation Measure:** The City will continue to enforce the existing Uniform Building Code and the requirement to install methane barriers for new construction within the vicinity of the landfill.

Timing: Immediate and ongoing Agency: Planning Department

Funding: General fund

- **Policy 2.3** Develop stringent site design and maintenance standards for areas with high fire hazard or soil erosion potential.
  - **2.3.1 Implementation Measure:** The City will work with the Los Angeles County Fire Department to review current standards for wildfire prevention. The City will work with the County Fire Department in improving standards and/or regulations where required.

Timing: Immediate and ongoing

Agency: City Manager Funding: General fund

- **Policy 2.4** Regularly review the technical data on public safety and seismic safety for use in the decision-making process.
  - **2.4.1 Implementation Measure:** City staff will update and amend the Master Environmental Assessment when appropriate following the review of more site-specific geotechnical studies and reports.

Timing: Immediate and ongoing Agency: Planning Department

Funding: General fund

- Policy 2.5 Continue to require preliminary investigations of tract sites by State-registered geotechnical engineers and certified engineering geologists (Chapter 70 County Building Code) and ensure regular inspection of grading operations.
  - **2.5.1 Implementation Measure:** The City will continue to enforce existing Uniform Building Code and Safety regulations.

Timing. Immediate and ongoing Agency: Planning Department

Funding: General fund

### Policy 2.6

Encourage residents to plant groundcover to reduce the brush fire hazard in areas adjacent to canyons, and to maintain native drought tolerant slope cover and provide appropriate irrigation to maintain plant cover and prevent erosion.

**2.6.1 Implementation Measure:** The City will publish a brochure outlining groundcover that is effective in reducing the risk of wildfire. The brochure should be included with the City's quarterly newsletter.

Timing: Immediate and ongoing

Agency: Planning Department and City Manager

Funding: General fund

# Policy 2.7

Maintain storm drains to prevent local flooding and debris flows, and encourage residents to assist in maintaining those drains that are the responsibility of the homeowner.

**2.7.1 Implementation Measure:** The City will cooperate with the Los Angeles County Public Works Department in maintaining storm drains in the City.

Timing: Immediate and ongoing Agency: Public Works Department

Funding: General fund

#### Policy 2.8

The City will continue to enforce the Water Conservation Ordinance adopted in 1991.

**2.8.1 Implementation Measure:** The City will continue to implement the Water Conservation Ordinance and promote the use of drought-tolerant landscaping and irrigation.

Timing: Immediate and ongoing Agency: Planning Department

Funding: General fund

## Policy 2.9

Avoid construction in canyon bottoms and participate in the National Flood Insurance Program. Require new development or expansion of existing development adjacent to canyons to assess potential environmental impacts from increased run-off and erosion and evaluate appropriate mitigation.

**2.9.1 Implementation Measure:** The City will implement the General Plan's Land Use Policy and evaluate the flood hazard potential in future environmental review. The City will ensure that development within areas designated as a Flood Hazard Overlay Zone mitigate the potential flooding impacts.

Timing: Immediate and ongoing Agency: Planning Department

Funding: General fund

#### **Policy 2.10**

Continue to enforce a Class B Roofing Ordinance for new development but encourage residents with wood shingle/unrated roofing materials to retrofit or upgrade their roofs with resistant eaves and awnings.

**2.10.1 Implementation Measure:** The City will continue to enforce existing ordinances and regulations that apply to roofing materials. The City will require old roofs to be removed prior to reroofing to increase fire-resistance of the structure.

Timing: Immediate and ongoing

Agency: Planning Department/Building & Safety Dept.

Funding: General fund

### Policy 2.11

Support the development of secondary water supplies for emergency water flow needs in an emergency.

**2.11.1 Implementation Measure:** The City will examine the feasibility of developing secondary emergency.

Timing: 1994

Agency: Public Works Department

Funding: General fund

### **Issue: Disaster Planning**

So as to minimize the damage to life and property that natural and man-made disasters may cause, a plan for prevention, preparedness and reconstruction will be developed.

- Goal 3: Plan and provide for the occurrence of disasters and emergencies.
- **Policy 3.1** Develop and coordinate medical assistance procedures in the event of a major disaster.
  - **3.1.1 Implementation Measure:** City staff will update the existing emergency preparedness plan and prepare an emergency preparedness brochure which will be distributed to the community.

**Timing: 1993** 

Agency: City Manager Funding: General fund

- **Policy 3.2** Inventory and, where necessary, acquire supplemental disaster communication equipment and other equipment, tools, and supplies.
  - **3.2.1 Implementation Measure:** City staff will complete an inventory of supplies and personnel as described in the Emergency Preparedness Program outlined in this Element.

Timing: Immediate and ongoing

Agency: City Manager Funding: General fund

- **3.2.2 Implementation Measure:** A survey will be done by the City periodically to establish an inventory of equipment which could be used in the event of a major disaster.
- Policy 3.3 Ensure that adequate provisions are made to supply drinking water for extended periods of time in the event of a major disaster.
  - **3.3.1 Implementation Measure:** City staff will inventory sources of potable water that could be used in the event of an emergency and the means to distribute that water to residents and others in the Planning Area.

Timing. Immediate and ongoing

Agency: Public Works Department

Funding: General fund

- **Policy 3.4** Develop procedures to follow in the event of flooding, erosion, and possible reservoir failure and investigate ways of reducing the likelihood of their occurrence.
  - **3.4.1 Implementation Measure:** The City will review contingency plans developed for the Multi-functional Management Hazard Plan.

Timing: Immediate and ongoing

Agency: City Manager Funding: General fund

- Policy 3.5 Ensure that the City Hall maintains a current emergency supply of water, food, blankets, and first aid to provide for all employees for a 3 day period.
  - **3.5.1 Implementation Measure:** A City staff person will be assigned the task of compiling a list of supplies and maintaining an adequate stockpile.

Timing: Immediate and ongoing

Agency: City Manager Funding: General fund

- **Policy 3.6** Encourage private businesses to develop disaster preparedness plans for their employees.
  - **3.6.1 Implementation Measure:** The City will prepare and distribute a brochure outlining recommendations for stockpiling supplies for employees.

Timing: Immediate and ongoing

Agency: City Manager Funding: General fund

- **Policy 3.7** Support the development and further implementation of a peninsula-wide disaster plan.
  - **3.7.1 Implementation Measure:** The City will coordinate its disaster planning efforts with neighboring jurisdictions in the region.

Timing: Immediate and ongoing

**Policy 3.8** Increase public awareness of City emergency response plans, evacuation routes and shelters, and in ways to reduce risks at the home and office.

**3.8.1 Implementation Measure:** The City will prepare a brochure outlining procedures to follow in the event of a major disaster. The brochure will be distributed to every household and business in the City.

Timing: Immediate and ongoing

Agency: City Manager Funding: General fund

**3.8.2 Implementation Measure:** The City will encourage the implementation of a City-wide Neighborhood Watch program.

Timing: 1993

Agency: City Manager Funding: General Fund

Policy 3.9

Establish and maintain a Multi-hazard Functional Plan, mutual aid agreement with neighboring jurisdictions, and coordinate with the American Red Cross and Los Angeles County Fire, Sheriff, and Public Social Services to develop specific plans for responding to emergencies.

**3.9.1 Implementation Measure:** The City will submit copies of its Multi-functional Hazard Management Plan to the Los Angeles County Fire and Sheriffs Departments for review. The City will review similar plans prepared by neighboring cities.

Timing: Immediate and ongoing

Agency: City Manager Funding: General fund

Policy 3.10

Coordinate emergency planning efforts with building managers of high-occupancy facilities, dependant care centers (nursing homes, day care centers, etc.) and critical facilities located in the City to facilitate emergency response.

**3.10.1 Implementation Measure:** The City will send brochures outlining emergency procedures to all critical facilities. The City will cooperate with the Los Angeles County Fire Department during the inspection of these facilities.

Timing: Immediate and ongoing

Agency: City Manager Funding: General fund

### **Issue: Individual Responsibilities**

Individuals and agencies should take on the responsibility of protecting themselves from harm. Also, assistance from other individuals and agencies will provide the City with increased manpower and resources to better protect public health, safety and welfare.

- Goal 4: Assign key Individuals In both the public and private sectors the responsibility of implementing public safety programs.
- **Policy 4.1** Provide City officials with a basis for disaster preparedness decision making and establish a public education program for disaster preparedness.
  - **4.1.1 Implementation Measure:** The Emergency Services Coordinator will conduct quarterly meetings with City personnel to ensure they are familiar with procedures outlined in the Multi-functional Hazard Management Plan.

Timing: Immediate and ongoing

Agency: City Manager Funding: General fund

- **Policy 4.2** Establish a line of command to ensure that the decision making process will function satisfactorily in the event of a major disaster.
  - **4.2.1 Implementation Measure:** The City will implement the Multi-functional Hazards Management Plan which has been adopted by reference.

Timing: Immediate and ongoing

- **Policy 4.3** Coordinate with the citizen groups and organizations to establish a viable body to provide emergency assistance in the event of a natural disaster.
  - **4.3.1 Implementation Measure:** The City Emergency Services Coordinator will work with local equestrian groups and other organizations to establish a Rolling Hills Estates Search and Rescue Team. The City will ensure that multipurpose trails are maintained in order to be serviceable by emergency vehicles in the event of a disaster.

Timing: Immediate and ongoing

Agency: City Manager/Public Works

Funding: General fund

**Policy 4.4** Encourage cooperation among adjacent communities to provide back-up law enforcement assistance in emergency situations.

**4.4.1 Implementation Measure:** The City will submit copies of its Multi-functional Hazard Management Plan to the Los Angeles County Fire and Sheriffs Departments for review. The City will review similar plans prepared by neighboring cities.

Timing: Immediate and ongoing

Agency: City Manager Funding: General fund

Issue: Crime

The City of Rolling Hills Estates and the L.A. County Sheriff's Department will continue to work together to provide residents with safety and security. Criminal activities will be met with measures designed to deter criminal activity.

# Goal 5: Reduce local crime, to the greatest extent possible.

**Policy 5.1** Work with, and support the Sheriff's Department in crime prevention and law enforcement efforts, to make sure there are adequate resources to meet the needs of the community.

**5.1.1 Implementation Measure:** The City will conduct an annual review of its contract with the Los Angeles County Sheriffs Department to ensure current service standards are maintained. Alternatives will be considered if service levels are considered inadequate.

Timing: Immediate and ongoing

**Policy 5.2** Cooperate with neighboring cities, Los Angeles County, California State and U.S. Federal agencies in crime prevention and law enforcement.

**5.2.1 Implementation Measure:** The City will cooperate with all law enforcement agencies in combating crime.

Timing: Immediate and ongoing

Agency: City Manager Funding: General fund

**Policy 5.3** Evaluate the incidence of crime and develop measures needed to deter crime or apprehend the criminals.

**5.3.1 Implementation Measure:** The City will monitor crime statistics for the peninsula and the City. The City will meet with Los Angeles County on a regular basis to discuss programs, ordinances, and other measures that will be effective in combating crime.

Timing: Immediate and ongoing

Agency: City Manager Funding: General fund

**Issue: Hazardous Materials** 

The unhealthful effects of certain chemicals and substances has led to extensive regulation of identified hazardous materials. The City should be active in the regulation of the use, generation, transport and disposal of hazardous materials in the City in order to protect the health and safety of residents.

Goal 6: Reduce the potential for hazardous waste contamination in the City.

**Policy 6.1** Restrict the travel of vehicles carrying hazardous material through the City.

**6.1.1 Implementation Measure:** The City will ensure the Los Angeles County Sheriff's Department and the California highway Patrol enforce licensing and current laws regarding the transport of hazardous materials through the City.

Timing: Immediate and ongoing

**Policy 6.2** Monitor and limit the use and production of hazardous materials by businesses and industries in the City.

**6.2.1 Implementation Measure:** The City will ensure that the Los Angeles County Fire Department conduct regular inspection of major users in the City. The Emergency Services Coordinator will monitor the results.

Timing: Immediate and ongoing

Agency: City Manager Funding: General fund

- **Policy 6.3** Ensure that no hazardous materials are dumped in Chandler Quarry landfill or in any other areas of the City.
  - **6.3.1 Implementation Measure:** The City will work with Los Angeles County to ensure that periodic inspections of the Chandler Quarry are conducted.

Timing: Immediate and ongoing

Agency: Planning Department and City Manager

Funding: General fund

- **Policy 6.4** Ensure that the Los Angeles County Sanitation District implements its closure and reclamation plans for Palos Verdes Landfill.
  - **6.4.1 Implementation Measure:** The City will meet with the Los Angeles County Sanitation District to review the District's reclamation and redevelopment plans. The City will cooperate with the District to ensure future development plans are consistent with those outlined in the General Plan.

Timing: Immediate and ongoing

Agency: Planning Department and City Manager

Funding: General fund

**Policy 6.5** Support County Hazardous Materials Management Plan (adopted by C.C. Ordinance 516) objectives and enforcement of current Fire Code regulations regarding the storage of hazardous materials.

**6.5.1 Implementation Measure:** The City's Emergency Services Coordinator will review current ordinances and practices to ensure that everything possible is being done to implement the County's Hazardous Materials Management Plan.

Timing: Immediate and ongoing

Agency: City Manager Funding: General fund

**Policy 6.6** Work to promote the safe use and disposal of household hazardous wastes.

**6.6.1 Implementation Measure:** The City will implement those programs outlined in the Household Hazardous Waste Element.

Timing: Immediate and ongoing

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#### **SECTION 8.3 PUBLIC SAFETY PLAN**

#### INTRODUCTION

This section of the Public Safety Element provides an assessment of risk for both natural and man-made hazards in the city. In addition, the Element provides the basis for emergency preparedness in the city.

The following issues need to be considered in disaster and safety planning efforts:

- # The City needs to coordinate with the County Fire, Sheriff, Area G Emergency Services Coordinator, and City Administrator's Office to develop an effective Rolling Hills Estates Multi-Hazard Function Plan. Emergency plans for the City of Rolling Hills Estates must also reflect the nature of impacts likely to result from earthquakes, storms, and fires.
- # The City needs to coordinate with County Public Social Services and the American Red Cross to designate and operate emergency shelters and reception centers. Ideally, shelters should serve as first aid stations, public information and emergency coordination centers, as well as gathering and collection areas for displaced or evacuated people.
- # In addition to regular training exercises, coordination with self-help neighborhood and community groups is necessary to maintain the efficiency of the City's emergency response.
- # Increased public awareness of City emergency response plans, evacuation routes, and shelters, in addition to information on how to reduce risks at the home and office, improves overall safety in the City.
- # Provisions need to be made for traffic Control contingencies along City designated disaster routes, especially for Palos Verdes Drive North which can become highly congested at certain times of the day.
- # The Newport-Inglewood Earthquake Scenario by Toppozada et al., 1989 needs to be assessed in the development of emergency planning contingencies for the City. In addition, a major earthquake on the Palos Verdes fault should also be used as a worst-case earthquake disaster for emergency planning purposes.

# Reconstruction policies are necessary to guide rebuilding and reconstruction in the aftermath of a major earthquake or other disaster. Rebuilding decisions often require detailed structural analysis and geotechnical/geological studies. Some California jurisdictions require studies if more than 50 percent of the property is damaged in a disaster to ensure that repair is permanent and not a public safety hazard.

#### LAND USE POLICY AND PUBLIC SAFETY

Many of the safety issues that require consideration in future planning are directly related to Southern California's seismic setting, while other issues are particular to the Peninsula's distinctive geologic and topographic setting. Southern California is located in a seismically-active region of the world, experiencing on average, an earthquake of Magnitude 4 or greater every four years.

The Los Angeles Basin is traversed by many active faults and folds associated with the boundary between the North American and Pacific plates. Some of these faults include the San Andreas, Newport-Inglewood and Palos Verdes. The basin is also subject to compressive forces responsible for many east-west trending folds, including the Palos Verdes Hills, the Puente Hills, and the chain of hills and mesas that stretch along the length of the Newport-Inglewood fault.

The climate, topography, and local geology also play important roles in defining the threat to the City from fires and floods. The native soils and local climate sustain certain kinds of chaparral vegetation. The varieties of chaparral found on the peninsula contains particularly high concentrations of volatile oils which are extremely flammable. Areas where stands of this kind of vegetation are especially dense, such as along canyon bottoms, are very susceptible to brush fires. The ridge and canyon topography also control where the primary flood hazards in the City occur, primarily along canyon bottoms.

Rolling Hills Estates is largely developed into low and medium-density residential uses, with only smaller areas designated for high-density residential and light commercial uses. Large-scale growth is not anticipated to be a major planning factor in the coming years. Small-scale development will likely occur in the form of infilling of isolated parcels and expansion of existing residential lots. Given the expected growth pattern and environmental setting, certain safety planning issues are apparent. The following are findings, selected and abbreviated to present principal safety planning issues.

- # The City is at risk from strong ground motion from a number of nearby seismically active faults. Potential damage to new and most existing development will be slight to moderate though severe damage to vulnerable buildings cannot be precluded. Given the risk, critical facilities must be designed and maintained with a greater safety margin.
- # A major earthquake on the Newport-Inglewood, Palos Verdes, Cabrillo, or Torrance-Wilmington faults has the potential for setting into motion multiple events, including injuries, crowd control problems, landslide-blocked roads, hazardous materials releases, and isolated structural damage and/or fires. A major earthquake on the Palos Verdes fault is a credible worst-case scenario and must be considered in the development of an emergency response plan.
- # Certain localities of undeveloped land in the northeast section of the City are underlain by the Palos Verdes fault or man-made sediments prone to earthquake-induced ground failure (liquefaction), making any new development in these areas susceptible to damage.
- # Small, potentially active landslides will continue to pose constraints to new development and enlargement of existing residential lots adjacent to canyons areas; and one postulated "Silver Spur Landslide Complex" remains a long-term threat unless its existence is adequately disproved.
- # The failure of the Palos Verdes Reservoir is unlikely. If the dam is breached, the impact on Rolling Hills Estates would be minimal, as long as new development does not occur in the potential inundation zone.
- # Flood risk in the City will remain low if canyon drainages remain undeveloped, although long-term planning for drainage devices may be needed to control runoff and prevent local ponding.
- # Chaparral-filled canyon areas will continue to pose a significant fire hazard in the City, highlighting the need for strict enforcement of brush management and fire prevention programs. The risk of fire is as much influenced by brush hazards in neighboring jurisdictions.
- # Hazardous materials accidents in the City are not likely to cause widespread impact, however, a major accident in neighboring industrial districts could effect the entire City.

# The closed Palos Verdes Landfill received large volumes of wastes, some of which may be hazardous materials, through the early 1980's; contamination is a site constraint, as well as a threat to a shallow ground water aquifer underlying the Los Angeles Basin.

The degree of risk from these hazards are separated into three distinct categories:

- # Acceptable Risk. Level of risk below which no specific action by government is deemed to be necessary.
- # *Unacceptable Risk*. The level of risk above which specific action by government is deemed to be necessary to protect life and property.
- # Avoidable Risk. Risk not necessary to take because individual or public goals can be achieved at the same time, or less, total "cost" by other means without taking the risk.

Appropriate risk must be determined with maximum citizen input. In making this determination, the appropriate planning response to a potential hazard involves the judgement, either expressed or implicit, of the risk that is acceptable. There is no such thing as a perfectly hazard-free environment. Natural and man-made hazards of some kind and degree are always present. However, efforts can be productively undertaken to try to mitigate the consequences of known hazards.

For planning purposes, hazards, and the degree of risk in Rolling Hills Estates has been further refined. The objective of the Public Safety Element is to provide the community with a comprehensive inventory of those hazards that are a major concern in the community (geologic hazards, flooding, and fire hazards) and to develop appropriate policies that address those hazards.

The Public Safety Element Background Report (Section 8.4 of this Element) provides a detailed inventory of hazards in the city. For planning purposes this background information should be consulted to determine the nature and extent of any hazards that may be present on a site. This section of the Public Safety Element provides for a Hazard Management Overlay Zone which identifies those areas where some hazard is present which will need to be considered or evaluated prior to any development proposal.

For planning purposes, the City of Rolling Hills Estates has been divided into a series of risk zones including the following:

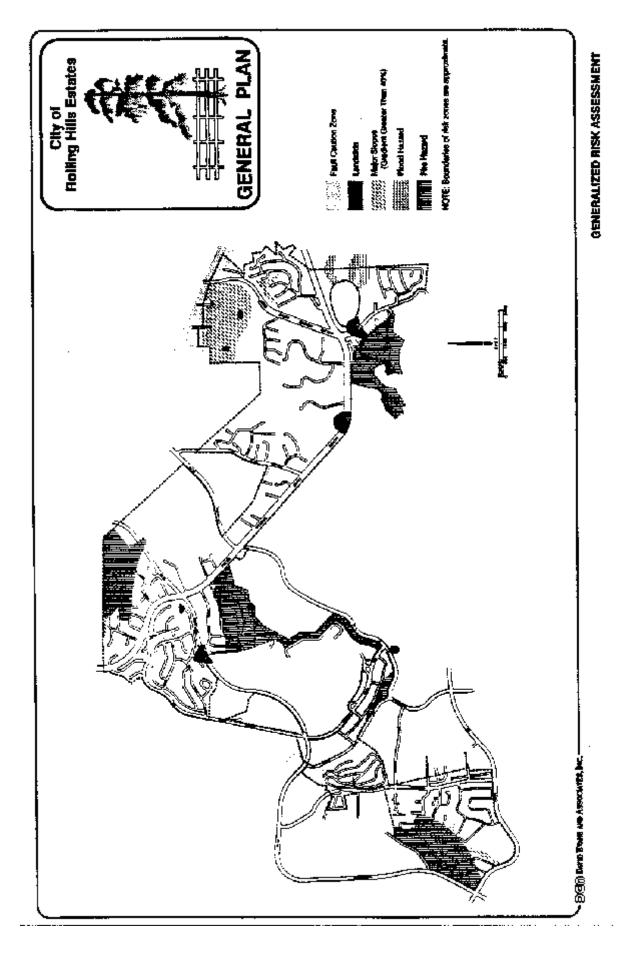
- # *High Risk*. Areas where environmental hazards are significant enough to warrant on-site investigation to evaluate the risk and to design appropriate mitigation.
- # Moderate Risk. Areas where a risk is likely to be present and current precautions sustained in building, public, and safety codes should be adequate.
- # Low Risk. This designation applies to those areas subject to the same environmental hazards are that found elsewhere in the region.

The categories of risk discussed above considers the following hazards:

- # Satanic Hazards and fault rupture zones. Areas where fault traces are present and fault investigations should be completed prior to development.
- # Wildfire Risk. Areas where brush hazard factors, vegetation type, proximity to source, and slope present a moderate to high risk of fire hazard.
- # Flood Hazard. Areas at risk due to flash flooding in channels or inundation due to a break of the Palos Verdes Reservoir.
- # Slope Stability. Area where potentially active landslides are present and mitigation may be required to stabilize the slopes.
- # Landfill Gases. Areas of known landfill (i.e. Howlett Park, Botanical Gardens, Hawthorne Canyon, and Palos Verdes Landfill) may generate gases. To mitigate any hazardous risks associated with these gases, proposed developments within 1,000 feet of a landfill must submit a special report to the Building Department. The report must describe methods by which the proposed development will prevent gas intrusion and prevent the accumulation of gases within or under enclosed portions of a building.

Exhibit 8-1 indicates those areas where the above risks are present and the Hazards Management Overlay designation applies. The Planning Department will require the following actions to be completed prior to issuance of a building permit for areas located within the Hazards Management Zone Overlay designation.

# All development request must undergo a preliminary environmental assessment to determine the nature of additional study required.



- # Appropriate evaluation by seismic, flooding, geotechnical, or wildfire risk must be completed by knowledgeable professionals to determine the nature and extent of risk.
- # Appropriate mitigation must be identified and implementation must be monitored

#### HAZARDS REDUCTION/EMERGENCY PREPAREDNESS PROGRAMS

Hazard reduction programs are designed to improve the safety of existing development. For example, some older development, being built to outmoded code standards, could benefit from seismic upgrading. Owners of older residences or commercial structures may voluntarily upgrade, or if a commercial facility is undergoing significant reconstruction, newer safety standards can be incorporated. Additional examples of hazard reduction programs include:

- # Strengthening of waterlines and utilities infrastructure and the development of emergency back-up capability by public utilities serving the City.
- # Regular fire safety inspections and fire flow tests to identify areas withcracked or damaged water lines.
- # Auxiliary water systems to supplement existing water lines to ensure needed fire flow if pipelines are damaged. Gravity-fed or generator-operated pumps from swimming pools or tanks can also supplement flow.
- # Requiring planted slopes to prevent erosion.
- # Planning for emergency response at the government and individual level reduces hazards and risks to the public.

The State and Federal Governments require local governments to prepare and maintain emergency plans as a condition of certain funding assistance. The City of Rolling Hills Estates is planning to update its local emergency plan to meet current standards found in Office of Emergency Services (OES) Multi-Hazard Functional Planning Guidelines (OES, 1985). One of the first steps of a Multi-Hazard Functional Plan (MHFP) is to create an emergency response organization. The main elements of the Rolling Hills Estates organization will provide the following functions:

- # Emergency Operations Carter (EOC) The EOC coordinates and directs local and mutual aid resources to urgent crisis situations in the City. The center operates as a liaison with the County, other City emergency operations centers, and the Governor's Office of Emergency Services.
- # County Sheriff Department The Sheriffs Department provides perimeter and crowd control, restricts and reroutes traffic, and manages evacuations as required.
- # County Fire Department The Fire Department provides fire suppression, emergency medical, urban search and rescue, and hazardous materials response and control services.
- # County Department of Building and Safety The Department of Building and Safety provides emergency cleanup of debris and inspections of hazardous buildings and County utility services.
- # City Agencies The City will provide or support emergency functions, such as search and rescue, management of fatalities and injured persons, emergency shelter, coordination with private utilities, and dissemination of public information. The City will provide emergency cleanup of debris in the City's public right-of-ways.

Disaster preparedness and response planning requires an assessment of hazards, identification of functions and resources, and development of a procedural network under a variety of disaster scenarios. Responsibility for developing short-term and long-term actions to reduce risk and lessen the impact of a disaster falls on the Public Safety Element, and will support objectives of the City MHFP.

#### Risk Assessment

The City of Rolling Hills estates Public Safety Element identifies earthquake shaking, associated fissuring and ground failure; storm induced landslides and local flooding; and brush fires and hazardous materials accidents as emergency planning issues. A major earthquake presents the greatest challenge. Earthquakes occur with little or no warning and often set into motion multiple events, some worse than the original earthquake, and some similar to situations posed by other disasters. A Newport-Inglewood Earthquake is most likely to occur within a time frame of interest for most building decisions; however, a major earthquake on the Palos Verdes fault is a credible possibility and is useful as a worst-case disaster planning scenario.

The following are selected planning elements that need to be considered in the development of emergency response plans:

- # The identification of an Emergency Operations Center, and potential temporary shelters and reception areas. The City Hall will serve as the EOC.
- # The identification of casualty collection points and sheriff/fire staging areas. The Public Safety Element identifies these areas.
- # The designation and training of the emergency response organization, which would include representatives from County agencies, City departments, utilities, schools, and volunteer groups. The Multi-function Hazard Plan and policies contained in this element together with supporting implementation measures identify appropriate actions that need to be followed.
- # The identification of skilled human resources, such as amateur radio operators, heavy equipment operators, equestrian rescue units, and medical support personnel. Local medical resources, such as the Palos Verdes Medical Center, would be an important participant in the City's emergency response. The Public Safety Element includes policies and implementation measures calling for the identification of individuals and organizations which would comprise such an emergency response team.
- # The planning for emergency equipment needs, including battery powered and mobile generators, cranes, bulldozers, large ladders; personal gear such as respirators, gloves, and protective clothing, medical equipment and supplies, and tents for temporary shelter and emergency medical centers. The Public Safety Element includes policies and implementation measures calling for the identification of individuals and organizations which would comprise such an emergency response team.
- # The development of organizational charts and brief operational checklists and phone numbers. The Public Safety Element calls for the development of such a list and a periodic review of the procedures City staff will follow in the event of a major emergency.
- # The development of an inventory of emergency supplies and coordination with managers of high occupancy facilities, dependent care centers (nursing homes, day care centers), and critical facilities located in the City.

- # Conducting regular training exercises or drills with the County to evaluate how well the City emergency response organization responds to a regional simulated disaster. A number of Public Safety Element goals and policies call for the Coordination of emergency procedures with County agencies.
- # The development of programs that increase public awareness of potential hazards and risks so that they are familiar with procedures to follow in the event of a major disaster. The Public Safety Element calls for the preparation of a brochure that would be distributed to all households and businesses in the City.
- # The development of voluntary and neighborhood self-help groups that can respond to light rescue, local fire control, and medical assistance needs. A Public Safety Element policy and implementation measure calls for the creation of a City search and rescue team.
- # The City must provide where possible for alternative or back-up essential lifelines, such as water flow, sewer, and electrical services; and redundant communication lines, such as cellular phones, to ensure efficient response to a crisis, including provisions for specific emergency radio frequencies for the City MHFP.
- # The City must draft mutual aid agreements with neighboring cities, and with County, State, and Federal emergency relief agencies; and with private enterprises such as Red Cross, Salvation Army, and medical institutions to assist in shelter and relief operations.

After a disaster, and an earthquake in particular, short-term disaster recovery requires disaster operations that are not as immediate as fire suppression or medical attention, but are equally important to protecting public safety. The Multi-hazard Functional Plan will address short-term recovery, such as clearing City streets and transportation corridors to be used for evacuation and emergency access. The Multi-hazard Functional Plan will also contain provisions for restoring utilities and performing safety inspections of structures or buildings weakened by an earthquake, or other consequences resulting from fire, flood, or dam failure.

One short-term consequence of a disaster is the temporary displacement of residents and/or workers stranded in the City. The County Department of Social Services maintains an inventory of schools, recreation facilities, and community facilities that can be used as temporary shelters as part of the County Multi-hazard Functional Plan. No County temporary shelters have yet been

designated for the City of Rolling Hills Estates. Exhibit 8-2 shows proposed temporary emergency shelters for the City based on guidelines developed in coordination with Public Social Services. Public Social Services intend to add these facilities to their County-wide inventory.

Shelters should be structurally sound, if indoors, or located adjacent to an open space, such as a park or school. They should provide temporary housing and serve as emergency reception and communication centers.

The Multi-hazard Functional Plan does not address longer-term recovery. Two critical issues that need to be considered in the long-term recovery of the City following a major disaster includes the following:

- # The long-term homelessness created by heavily damaged property or houses, through earthquake, landslide, or mud or debris flow; and
- # The rebuilding of structures in areas heavily damaged in a disaster.

Longer-term housing needs will be necessary while damage is assessed, disaster assistance applications are considered, and rebuilding take place. Prezoning to permit temporary housing, such as trailers or tents, can facilitate the recovery process.

After a damaging storm or earthquake, the City will need to:

- # Define the affected area;
- # Assess the effectiveness of emergency repairs and identify permanent repairs options;
- # Help individuals and businesses qualify and apply for funds to repair and rebuild; and
- # Incorporate actions to mitigate future hazards into plans to rebuild and regulate new development in heavily damaged areas.

Financial impact caused by business disruption (and loss of revenue), or the homeowners desire to reoccupy a damaged property, increases the pressure to rebuild rapidly after a disaster. Rational building decisions must be made by the reviewing agency at this stage. A reconstruction ordinance allows the definition of standards for rebuilding decisions before a disaster occurs.

Circumstances for bringing the damaged property up to current code or some other acceptable level are usually incorporated into such an ordinance.

A main element of a reconstruction ordinance is the "preliminary assessment of damage" and initial recommendations. Rebuilding decisions often require detailed geotechnical/geologic studies or structural analysis to determine and assess the effectiveness of emergency repairs, and identify appropriate permanent repairs. One option is to require environmental studies if more than 50 percent of the property is damaged in a disaster, whether it is caused by structural damage or massive landsliding, fault rupture, or other ground failure.

Cities may enact an Interim Ordinance as an urgency measure in order to consider "consistency with the General Plan" for up to two years, if the existing use may endanger public safety if rebuilt. The interim ordinance, however, has been a liability to some local governments. A reconstruction ordinance helps the City consider the impact of reestablishing areas proven to be susceptible to a high-risk from a natural or urban hazard. The Ordinance also facilitates rebuilding, in certain cases, by defining conditions when permits can be waived if redevelopment is safe and beneficial to the City.

## **Emergency Evacuation Routes**

Hawthorne Boulevard, Crenshaw Boulevard, and Palos Verdes Drive East are the designated emergency evacuation routes in the City. Los Angeles County Public Works has prioritized these routes for debris clearance and road repairs in the event they are damaged during a major earthquake or other natural disaster. Indian Peak Road, Palos Verdes Drive North, and Silver Spur Rood are disaster routes proposed to augment County routes for City-specific emergency planning purposes. Actions warranted along such routes, single access ways to neighborhoods, and other routes where emergency access could be threatened include:

- # Implementation of mitigation measures that prevent earthquake induced slope failures from blocking roads;
- # Improvement of streets of inadequate width or inadequate drainage that can hinder the mobilization of fire equipment and other emergency vehicles; and
- # Development of specific plans for traffic control contingencies and evacuation of high occupancy and immobile populations. The County Fire Department, for instance, has indicated that response times are appreciably reduced during peak traffic along Palos Verdes Drive North.

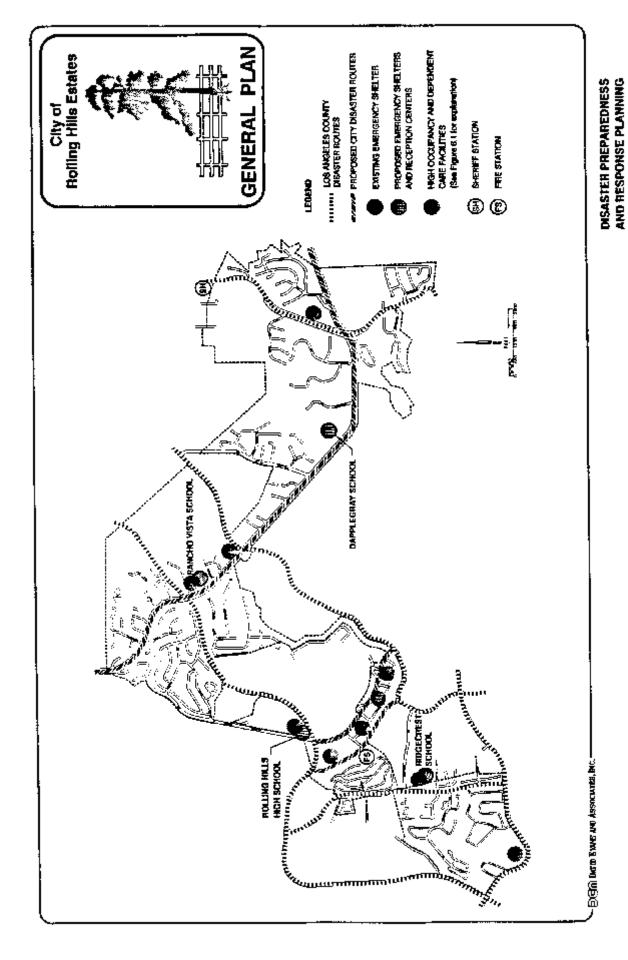
In addition, these roadways are important routes for police and fire vehicles responding to emergency calls in the city. Disaster routes function as primary thoroughfares for movement of emergency vehicles (Fire, Sheriff, heavy equipment, etc.). The selection of evacuation routes, on the other band, depends largely on the particular situation; i.e., the nature and location of the hazard and the occupancies that need to be evacuated. For evacuation or emergency egress to neighborhoods with only a single access, the single access can become the critical route. Disaster routes and evacuation routes are similar in that plans must be made for traffic control during rush hour or cleanup of debris off of roads. However, disaster routes, by design, are in close proximity to most critical facilities, such as fire stations, schools, and high occupancy buildings. This allows the development of specific emergency plans along County-designated routes, as well as Palos Verdes Drive North, Silver Spur Road and Indian Peak Road.

The direction of travel on these roadways and any restrictions to vehicular movement will depend largely on the nature, location, and spatial characteristics of the event leading to the evacuation. In all cases, facilities with immobile populations, such as day care centers or nursing homes, or residences with the handicapped should be pre-identified. If evacuation is required during the daytime, provisions must be made for the high occupancy businesses in the Silver Spur commercial district, including temporary shelter. The Public Safety Background Report identifies some facilities in the City that have already been identified by the County Fire Department as requiring special needs in a disaster.

### **Emergency Shelters**

The emergency shelters and reception areas are also indicated in Exhibit 8-2. Emergency shelters are assigned to provide short-term shelter for persons stranded in the city of left homeless in the event of a disaster. These shelters may also be used to dispense supplies, serve as first aid stations, and serve as public information centers. Reception centers are gathering/collecting areas where information, first aid, and supplies are dispensed.

A large department store located in the Silver Spur Shopping Complex, has been the sole emergency shelter in the City for years, primarily for protection from a nuclear blast. Temporary shelters for evacuated residents or non-residents displaced by a major earthquake disaster demands a different type of facility. Temporary shelters need to be structurally sound, if indoors, or located in or adjacent to an open space, such as a park or school. The temporary shelters shown on Exhibit 8-2 are preliminary; they should be reviewed and formally incorporated into the City's Multi-Hazard Functional Plan. They include:



- # Rolling Hills High School
- # Rancho Vista Elementary School
- # Dapplegray Intermediate School (presently unoccupied)

County Public Social Services and the American Red Cross may have additional choices. After a major earthquake, open spaces are valuable because tents or mobile homes may be used to temporarily house the homeless or displaced. Shelters are often operated by the American Red Cross, and also serve as first aid stations, public information centers, and communications centers. Another important function is to provide a reception area to reunite school children with their parents. Ridgecrest Intermediate School, located at the corner of Crestridge and Highridge Roads in the City of Rancho Palos Verdes, is a County-designated emergency shelter available to residents of the southern portion of Rolling Hills Estates.

### Earthquake Emergency Preparedness

The potential for earthquakes represents the most significant risk to the City. As indicated in Section 8.4 of this element, there is a high probability that a major damaging earthquake will impact the area sometime in the next several decades. In recognition of this risk, a comprehensive Multi-functional Hazards Management Plan has been prepared indicating actions that will need to be taken by City staff and specific areas of responsibility.

The General Plan's Public Safety Element is not intended to supplant or replace existing emergency plans or programs. The focus of this Element is to establish policies with regard to public safety, identify constraints and hazards that need to be considered in future planning, and to articulate specific standards that should be maintained or strived for.

Key elements of this program will involve the following:

- # The creation of a staff position to serve as an Emergency Services Coordinator. This position may be filled by an existing member of City staff.
- # Form an Emergency Services Committee consisting of city staff and residents which will direct emergency operations in the event of a major disaster. This group will cooperate with the County Fire and Sheriffs Department if county agencies are able to handle the emergency.

- # A catalogue of trained personnel for example, doctors, nurses, medics, heavy equipment operators living or working in the City will be prepared and updated on a periodic basis. A listing of equipment (bulldozers, trucks, etc.) located in the City will also be compiled.
- # Members of the Traffic and Safety Committee will become familiarized with the multi-functional Hazards Management Plan. This group will prepare a working "action plan" to ensure every member clearly understands assigned responsibilities.
- # The Traffic and Safety Committee will organize the formation of a volunteer search and rescue group to assist in future emergency operations.
- # The City will publish pamphlets and provide information on the public cable access channel outlining procedures to follow in the event of a major disaster.

The Public Safety Element also serves the following functions:

- # Provides an accurate and up-to-date assessment of natural and man-made hazards in the City, including, but not United to, earthquakes, landslides, fire, flood, dam inundation, and hazardous materials accidents;
- # Provides a framework by which safety considerations are introduced into the land use planning process;
- # Strengthens the City's existing municipal codes, and their project review and permitting processes, to identify and mitigate hazards for new development;
- # Provides policies directed at identifying and reducing hazards in existing development; and
- # Strengthens earthquake, flood, fire and hazardous materials preparedness planning and post-disaster reconstruction policies particular to Rolling Hills Estates.

The Public Safety Element is primarily designed to develop short-term and long-term actions to reduce the scope of a disaster, thereby lessening its impact on the City. The Multi-Hazard Functional Plan provides a logistical framework for governmental response. However, the

Element recognizes that the public must be involved in the preparedness process to reduce risk further, especially in the event of a damaging earthquake.

The following is a list of tasks that the individual/individuals at the home or office should take to lessen the overall impact of a major earthquake.

### Before an Earthquake:

- # Remove or correct interior nonstructural hazards, such as top-heavy bookcases and storage cabinets, water heaters and other appliances. Anchor furniture and water heaters against the wall and replace gas-fired appliances with flexible connections.
- # Set aside a supply of emergency food and water, and obtain first aid materials, a gas shut-off wrench, fire extinguisher, and battery-powered radio. Identify neighbors with first aid training and check for an emergency supply of medication for all members of the family, especially the children, handicapped, and elderly.
- # Practice taking cover. This exercise will make people aware of the safest places during an earthquake, such as under a desk, table, bed or strong doorway. The maximum duration of severe shaking from a major earthquake expected to impact the City of Rolling Hills Estates is roughly 30 seconds.
- Practice exiting. Walk the possible escape routes from your house or office and plan to avoid light fixtures, masonry chimneys, unsupported walls and other overhead hazards. Power for elevators and escalators may fail in the Silver Spur Shopping Complex and other high-occupancy facilities, so be aware of alternate exits. Do not panic or run; crowded exits should be evacuated in an orderly manner to avoid additional injuries in a rush for the door. Emergency loud speaker systems may give instructions.
- # Practice turning off electricity and water and know how to turn off gas at the street main at your house. Do not practice gas shut-off because, for safety reasons, only the utility company should turn it back on. Be sure anyone in the household can locate main switches and valves.
- # Review the responsibilities of each family member after an earthquake. Plans for picking up children from schools, day-care centers, or other facilities with

dependents should be regularly checked and reviewed. Have the phone number available of the person outside of the area for management of family messages.

# Contact City and neighbors about forming a co-op self-help group.

#### After an Earthquake:

- # Check for injuries in your family and neighborhood.
- # Extinguish small fires and check for additional fire hazards, such as cracked walls, roof lines and attics, and other physical signs of structural damage that can cause a malfunction in the electrical wiring.
- # Check for the smell of leaking gas, and if detected, shut off gas at the gas meter.

  Unanchored gas heaters or gas-fired hot water heaters may experience damage to valves and service connections.
- # Shut off electrical power if there is damage to the wiring or there is a gas leak. The main switch is usually located in or next to the main fuse or circuit breaker box.
- # Clean up flammable liquids, medicines, and other harmful substances.
- # Check for structural and nonstructural damage, such as cracked chimneys, fallen power lines, and other objects that may become unstable and fall during an aftershock.
- # Try not to use water in case there is drop in water pressure for firefighting purposes (fire flow). Toilets should not be flushed until both incoming water lines and outgoing sewer lines have been checked to see if they are open.
- # Try not to use the phone unless it is a genuine emergency. Emergencies, damage report alerts, and other information can be obtained by turning on your radio.
- # Report serious injuries and significant damage to a nearby City emergency reception center.

# **Development Guidelines**

Technical expertise in reviewing and enforcing the Building Code and Fire Code for the City of Rolling Hills Estates is provided by the County of Los Angeles. The codes establish site-specific investigation requirements, construction standards, and project inspection procedures to ensure that development does not pose a threat to the health, safety and welfare of the public. The County Building Code, adapted from the Uniform Building and Fire Codes every three years, also contains base line minimum standards to guard against unsafe development. As discussed in the background report, investigation findings and other project variables may modify the implementation of a particular standard. Examples of County minimum standards include:

- # Grading standards: minimum slope angles of 1:5 (slope ratio rise over run) for cut slopes and 2:1 for fill slopes.
- # Fire access and fire flow requirements: minimum 20 foot width is required for private access roads; minimum fire flow of 750 to 1250 gallons per minute (gpm) is required for single-family residential homes.

Additional guidelines and standards can be introduced through the City's Safety Element and Municipal Codes. Zoning ordinances and subdivision regulations also support regulatory codes, and safety is protected as the City carries out its responsibilities under the California Environmental Quality Act (CEQA). CEQA requires that environmental constraints be considered prior to approval of significant projects.

Special development regulations reinforce and augment existing code standards by raising the level of hazard conscious project design and hazard mitigationengineering. Special development regulations include additional geologic/geotechnical investigation and construction standards. Fault and liquefaction investigations are required in the County Building Code, however, it is in the City's best interest to emphasize the level of investigationand protection. Some standards may apply to only critical facilities, such as detailed seismic analyses in high risk areas. Special construction standards may include reinforced foundations in areas of potential ground failure. Avoidance of the hazard may be appropriate in some cases where engineering methods cannot mitigate the hazards, such as is the case where active fault traces are identified during project investigation. Special minimum setbacks away from active faults can be defined for structures, lifelines, or critical facilities planned on or traversing the project site.

The General Plan establishes the following grading guidelines for future development:

- # All grading work should be in conformance with the provisions of the City's grading ordinance and Chapter 70 of the Uniform Building Code.
- # Grading activities should strive to minimize adverse impacts of the natural topography and environment.
- # Approved protective measures and temporary drainage provisions must be used to protect adjoining properties during grading.
- # The grading contractor shall provide for compaction tests and reports by a soils engineer certifying compliance with the above-mentioned Chapter 70.
- # Import materials shall be tested and certified prior to placement.
- # No work whatsoever shall be started without first notifying the grading inspector and soils engineer.
- # The location of dumping excess soil shall be approved by the grading inspector prior to the start of excavation.
- # Any damage caused during the grading operation must be corrected prior to the final approval of the grading operation.
- # All recommendations of the soils engineering report and all subsequent reports, addenda, and recommendations, etc., shall be considered a part of this grading plan and shall be complied with.
- # An erosion control plan shall be submitted to the City Engineer prior to start of the rainy season and all erosion control devices shall be provided and maintained during rainy season between October 15 and April 15 of the following year and shall be in place at the end of each day's work.
- # All on-site improvement shall be in accordance with the "Standard Specifics for Public Works Construction" (Latest Edition).

- # Minimum on-site structural pavement section shall be 2 inch A.C. on 4 inch aggregate base. Actual section shall be determined by field soil test and to be approved by the City Engineer.
- # Maximum slopes shall be 2:1 for cut and fill unless otherwise directed.
- # Fills are to be compacted to not less than 90% of maximum density as determined by A.S.T.M. soil compact test D1557-70 and certified by soils engineer, fill layer is not to exceed 6".
- # No fills shall be placed until vegetation has been removed and sub-grade prepared per Chapter 70 and applicable ordinances and approved by the grading inspector.
- # No rock or lumps with greater than 6" diameter shall be placed in the fill unless such placement is approved by the soils engineer and grading inspector.
- # Grading activities should strive to maintain natural topographic conditions.

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#### **SECTION 8.4 BACKGROUND REPORT**

#### INTRODUCTION

The Public Safety Element Background Report discusses safety issues in the City including earthquake, geological, fire, flooding, and hazards. The identification of hazardous conditions in the City provide a better perspective on the programs that are necessary to promote public health and safety.

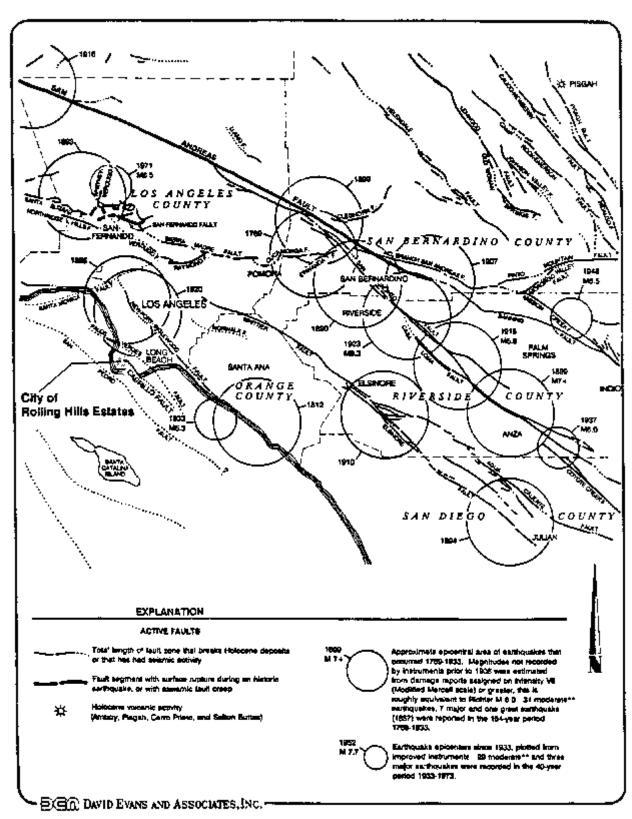
Many of the safety issues in the City of Rolling Hills Estates are directly related to southern California's seismic setting. Other issues are particular to the Peninsula's geologic and topographic characteristics. Southern California is located in a seismically-active region, experiencing on average, an earthquake of Magnitude 4 or greater every four years. The Los Angeles Basin, in particular, is traversed by many active faults, associated with the boundary between the North American and Pacific plates. Major faults include the San Andreas, Newport-Inglewood, and Palos Verdes faults. The basin is also subject to compressive forces responsible for many east west trending folds, including the Palos Verdes Hills, the Puente Hills, and the chain of hills and mesas that stretch along the length of the Newport-Inglewood fault.

The climate, topography, and local geology are major factors in fire and flood hazards. native soils and the local climate support certain kinds of chaparral vegetation which contain high concentrations of volatile oils and are extremely flammable. Areas where stands of chaparral are especially dense, such as along canyon bottoms, are highly susceptible to brush fires. Because the local topography contains ridges and canyons, the primary flood hazards in the City are primarily along canyon bottoms.

#### **SEISMIC HAZARDS**

Earthquakes occur frequently in southern California because many faults are present due to the complex geology associated with the convergence of the North American and Pacific plates. The better known seismically active faults in southern California are shown on Exhibit 8-3. The Palos Verdes Peninsula lies at the juncture of many of these fault systems.

Faults are classified as inactive, active, or potentially active. Active faults show proven displacement of the ground surface within the last 11,000 years (Holocene); and Potentially Active faults show evidence of movement within the last two million years (modified to 750,000 years by USGS, 1985 and adopted by Los Angeles County, 1990). This definition is designed as a yardstick for surface rupture potential, and is used to prevent development from being constructed directly on an "active" fault trace. In general, potentially active faults are, relative to



# MAJOR FAULTS IN SOUTHERN CALIFORNIA

active faults, less likely to be the origin of a damaging earthquake. However, there is a gradation of seismic risk posed by potentially active and active faults. For example, of the "active" faults closest to the City, the Newport-Inglewood, Palos Verdes, and Cabrillo faults pose successively decreasing degrees of seismic risk.

Table 8-1 lists the likelihood of a major earthquake on active and potentially active faults in the region and the degree of intensity and potential impact on the City. The "low likelihood" faults may have a greater impact on the City due to their proximity. Earthquake intensities are reflected in a modified Mercalli scale which is described in Table 8-2.

TABLE 8-1 RELATIVE LIKELIHOOD AND IMPACT OF SELECTED MAJOR EARTHQUAKES ON THE CITY OF ROLLING HILLS ESTATES					
Fault Name	Occurrence	Max. Cred. a	Intensity b		
San Andreas (Mojave Segment)	High	7.5	VII		
San Andreas (San Bernardino Mountain Segment)	High	7.5	VII		
San Fernando	Moderate	6.5	V-VI		
San Andreas (Carrizo Segment)	Moderate	8.0	VII-VIII		
Elsinore	Moderate	7.1	VI-VII		
Whittier	Moderate	7.3	VII-VIII		
Newport Inglewood	Low	6.9	VII-VIII		
Offshore Newport Inglewood	Low	6.8	VI		
Palos Verdes	Low	7.0	IX-X		
Malibu Coast	Low	6.9	VI-VII		
Cabrillo	ow	6.6	VII-VIII		
Santa Monica	Low	6.7	VI-VII		
Redondo Canyon	Low	6.4	VI-VII		

a) Maximum Credible Earthquake each fault is predicted capable of generating, and the likelihood of such an earthquake occurring within the next 100 years. The probabilities were ranked as high, moderate and low as follows: high- greater than 50%, moderate- 10 to 50%, low- less than 10%.

b) Intensity is based on the Modified Mercalli Intensity which is defined in Table 8-2.

#### TABLE 8-2 MODIFIED MERCALLI INTENSITY SCALE

- I Tremor not felt.
- II Tremor felt by persons at real or in upper floors of a building.
- III Tremor felt indoors. Vibrations feel like a light truck passing by; may not be recognized as an earthquake. Hanging objects swing.
- IV Hanging objects swing. Vibrations feel like a heavy truck passing by, and the jolt feels like a heavy ball striking the walls. Standing cars rock. Windows, dishes and doors rattle. Glasses clink and crockery clashes. Wooden walls and frames crack in the upper range of scale IV.
- V Earth felt outdoors, and its direction can be estimated. liquids are disturbed, some spilled. Small unstable objects are displaced or upset. Doors swing, closing and opening. Shutters and pictures move. Pendulum clocks stop, start, or change rate.
- VI Earthquake felt by everyone. Windows, dishes, and glassware are broken. Knick-knacks and books fall off shelves; pictures fall off walls. Furniture moves or is overturned. Weak plaster and masonry Dare cracked.
- VII Steering of motor cars is affected. Partial collapse of masonry C structures. Some damage to masonry B; none to masonry A. Fall of stucco and some masonry walls. Twisting and falling of chimneys, factory stacks, monuments, towers, and elevated tanks. Frame structures, if not bolted to foundation, shift. Loose panel walls are thrown out; decayed pilings brake off.
- VIII Damage slight in specially designed structures though considerable in unreinforced buildings.
- IX Masonry D structures destroyed, masonry C heavily damaged, sometimes completely collapsed. General damage to foundations. Frame structures, if not bolted, shift off their foundations. Underground pipes are broken. Conspicuous cracks in the ground.
- X Most masonry and frame structures are destroyed. Most foundations destroyed. Some well-built wooden structures and bridges are destroyed. Serious damage to dams, dikes, and embankments. Underground pipelines are seriously damaged. Large landslides.
- XI Underground pipelines completely out of service. Many and widespread disturbances of the ground, including broad fissures, earth slumps and land slips in soft, wet ground. Sea-waves (tidal waves or tsunami) of significant magnitude. Severe damage to wood-frame structures, especially if near to the shock center.
- XII Damage is nearly total. Lines of sight and level are distorted. Objects are thrown into the sir. Great and varied disturbance of the ground, including numerous shearing cracks, landslides, large rockfalls, and numerous and widespread slumping of river banks.
- Masonry A: Good workmanship, mortar and design. Reinforced, especially laterally, and bound together with steel, concrete, etc. Designed to resist lateral forces.
- Masonry B: Good workmanship and mortar. Reinforced, but not designed to resist lateral forces.
- Masonry C: Ordinary workmanship and mortar. Not reinforced or designed to resist horizontal forces.
- Masonry D: Weak materials, such as adobe; poor mortar. Low standards of workmanship; weak horizontally.

These masonry types are not to be confused with the conventional Class A, B, and C construction types

\* Modified and rewritten after Richter (1958) and Toppozada and others (1988) using Rossi-Forel's Intensity Scale.

Groundshaking from an earthquake can result in liquefaction, landslides, or structural damage. The intensity of seismic ground shaking at any given location is influenced by the magnitude of the earthquake, the distance of the epicenter to the planning area, and local geologic and topographic conditions. The amount of damage generally depends on the size, shape, age, and engineering characteristics of affected structures. Development in the City of Rolling Hills Estates is built to relatively modern standards, and the single-story, woodframe construction of the residential developments, although not immune to structural damage, is notably resilient to earthquake shaking.

Detectable ground shaking in Rolling Hills Estates could be caused by a number of faults in the area (refer to Table 8-1). However, as indicated previously, only a number of the faults have the potential for causing strong ground shaking in the City. The Palos Verdes, Cabrillo, Redondo Canyon, Newport-Inglewood, Santa Monica-Malibu Coast, Whittier and Torrance-Wilmington fault systems are most likely to cause high ground accelerations in the City.

The San Andreas fault has the highest probability of generating a maximum credible earthquake in California within the next 30 years. The anticipated "big one" is thought to be capable of generating peak horizontal ground accelerations of 0.9g (g is the acceleration of gravity, equal to 32 feet per second squared) in Rolling Hills Estates, with seismic intensity values of VII (refer to Table 8-2). Such an event would have an expected duration of 35 to 50 seconds. Several factors affect earthquake impacts on structures, making the hazard of ground shaking difficult to predict. In general, long-period seismic waves (characteristic of earthquakes that occur 9 miles or more from the planning area) damage preferentially long-period structures such as high-rise buildings, bridges and freeway overpasses. The San Andreas fault is 35 miles from Rolling Hills Estates at its closest point. The City does not have any major long-period buildings and infrastructure, thus, a "big one" on the San Andreas is not likely to cause any significant structural damage in the City.

The *Palos Verdes* fault has, in the last few years, been considered as active, based on late Pleistocene and Holocene age displacements that have been interpreted along offshore segments of the fault in the San Pedro shelf (Darrow and Fischer, 1983). The fault is considered to be capable of generating a maximum credible earthquake of Magnitude 7.0 that would cause peak horizontal ground accelerations in Rolling Hills Estates and seismic intensities in the IX to X range.

The proximity of the Palos Verdes fault to the City would result in greater damage than that anticipated from an earthquake on the San Andreas fault. The short period seismic waves generated by nearby earthquakes interact preferentially with low-rise building and other

structures such as electric substations. With most buildings in the City being low- to mid-rise, a moderate to strong earthquake on the Palos Verdes fault will have more impact on the City than a stronger earthquake on a more distant fault. Ground shaking can also be focused on ridge tops, as evidenced in the 1989 Loma Prieta Earthquake by fallentrees, displaced boulders, and damaged structures located on the crest of hills and other topographic highs (EERI, 1989).

The nearest segment of the Newport-Inglewood fault is located approximately 9 miles east of Rolling Hills Estates. The 1933 Long Beach Earthquake, attributed to the Newport-Inglewood fault, generated Modified Mercalli intensities of about VII in the Palos Verdes Peninsula (Wood, 1933 in Toppozada et al., 1988). A maximum credible earthquake of Magnitude 6.8 on the Newport-Inglewood fault has the potential of generating horizontal peak ground accelerations of about 0.2 to 0.3g in Rolling Hills Estates. Ground shaking could last approximately 22 seconds, with seismic intensity values in the VII to VIII range. This earthquake would be particularly damaging to the low-rise, single-family structures in the City.

The Cabrillo fault is classified as active, also based on offset Holocene (younger than 11,000 years) sediments along its offshore segments, and on scattered micro-earthquakes. A maximum credible earthquake on this fault would generate peak horizontal ground accelerations of up to 0.5 to 0.6g in the City.

The Redondo Canyon fault, located offshore and extending from just north of the Palos Verdes Peninsula and into Redondo Canyon, is approximately 25 miles from Rolling Hills Estates at its closest point. A maximum credible earthquake on this fault (estimated Magnitude 6.4) could generate peak horizontal accelerations of about 0.45g in the City for approximately 18 seconds. This earthquake would also impact low-rise buildings preferentially.

The Santa Monica-Malibu Coast Fault System is an east-west trending fault system along the southern margin of the western Santa Monica Mountains and into Santa Monica Bay. Although there has been very little seismic activity along this fault system, the Malibu Coast fault segment has been characterized as active by Los Angeles County, based on displaced colluvial soils estimated to be about five thousand years old (Los Angeles County, 1990). The Santa Monica fault segment is considered to be potentially active. A maximum credible earthquake on the Santa Monica-Malibu Coast fault is estimated to result in peak horizontal ground accelerations of 0.11 to 0.14g in Rolling Hills Estates, with an estimated duration of approximately 21 seconds.

Maximum credible earthquakes on other faults further away from the City would generate horizontal peak ground accelerations ranging from .01 to .14g, with an average duration of approximately 20 seconds. The Whittier fault, which at its closest point is 23 miles from Rolling Hills Estates, has the potential of generating peak horizontal ground accelerations of 0.14g in the City. The duration of strong ground shaking associated with such a maximum credible earthquake is estimated at 31 seconds; seismic intensities in Rolling Hills Estates may be in the VIII range.

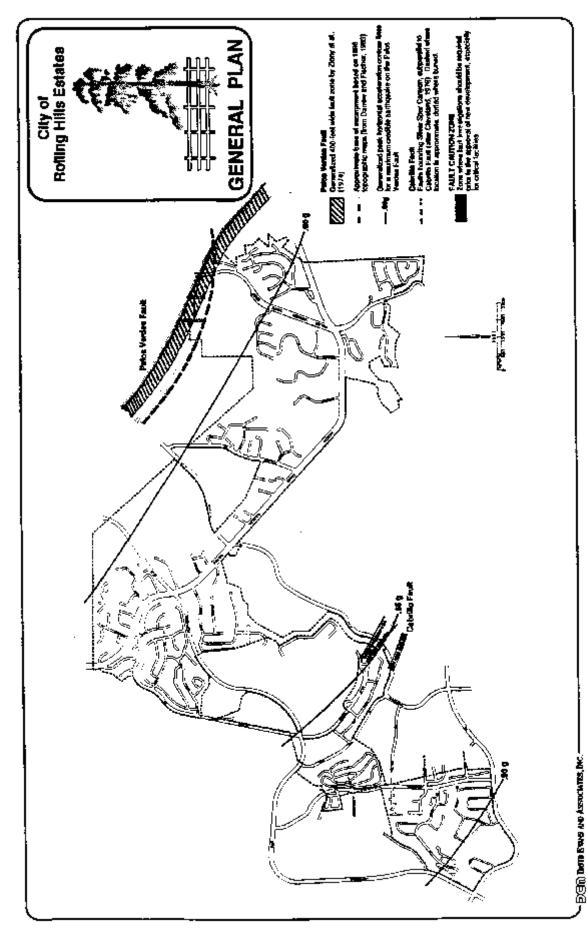
The Torrance-Wilmington fault is a newly postulated, blind thrust fault and fold system occurring at depth under the Palos Verdes Peninsula. (Blind thrust faults are low-angle or low-lying faults occurring generally 5 to 15 kilometers below the ground surface which have no surface manifestation.) These concealed faults have been recognized as capable of generating strong, damaging earthquakes since 1987, when a similar blind thrust caused the Whittier Narrows earthquake of Magnitude 5.9. Although the location of the Torrance-Wilmington Fault System is not well defined, the fault and fold belt has been divided into three segments. Hauksson (1990) estimates that if one of these segments ruptures, an earthquake of Magnitude 5 to 7.5, would occur. If two or more segments rupture simultaneously, an earthquake of Magnitude greater than 7.8, would occur.

# Fault Rupture Hazard

Fault rupture hazards are classified by the youngest geologic layer on the fault offsets. Surface fault ruptures, with consequent damage to structures directly overlying the trace of a fault, has led to the enactment of the *Alquist-Priolo Special Studies Zone Act (APSSZ)* of 1972. Evidence of fault displaced sediments that are less than 11,000 years old is used as a yardstick to gauge the surface rupture potential of faults. The objective of fault investigations within an *APSSZ* is to define the trace of the fault so that setbacks from the fault can be established. No Special Studies Zones have been designated within the City of Rolling Hills Estates. However, the *APSSZ* Act allows individual jurisdictions to create special studies zones around faults not yet recognized by the State as active.

The Palos Verdes fault, which extends across the northeastern corner of Rolling Hills Estates is considered active, but has yet to be characterized by the State with the *Alquist Priolo Act* (Exhibit 8-4). The proposed active designation is based on displaced Holocene sediments which were interpreted from geophysical data collected along the offshore segments of the fault in the San Pedro shelf.

The onshore segment of the Palos Verdes fault has generally been located along the north escarpment flanking the Palos Verdes Hills. A more precise location of the fault, however, has



SEISMIC HAZARDS IN ROLLING HILLS ESTATES

eluded geologists because the trace of the fault has been concealed by urban development, and by thick colluvial deposits (Darrow and Fischer, 1983). The lack of surface evidence of lateral movement on the Palos Verdes fault suggests to Hauksson (1990) that this fault is either accommodating very little of the stress in the Los Angeles Basin, or that moderate to large-sized earthquakes on the fault rarely rupture the surface. Although surface verging splays of the Wilmington-Torrance thrust belt may be within a few miles of the surface, the surface rupture potential of this fault is probably minimal. Rather, most stress may be regionally distributed through general uplift of the Palos Verdes Hills.

The onshore segment of the Cabrillo fault is hidden by landslides, complicating attempts to confirm its location and evaluate its onshore activity. Inferred traces of the Cabrillo fault, together with normal faults subparallel to the main fault, extend into the eastern boundary of the City (Cleveland, 1976). These faults, which bound the Silver Spur graben (down-dropped valley), have been attributed to either tectonic faulting, faulting associated with the postulated Silver Spur landslide complex, or to a combination of tectonic and landslide processes (Envicom, 1975; Robert Stone & Associates, 1985).

Ground fissuring has been documented on hillside areas in recent earthquakes. Ground fissures triggered by the 1989 Loma Prieta earthquake appear to have occurred along previously mapped secondary faults to the San Andreas fault, or were associated with apparent fault-related topography (EERI, 1989). Displacement, generally along the fault line with some components of lateral and vertical movement, appeared to occur mostly along high-angle bedding planes in bedrock of similar age and characteristics as the siltstones underlying the Palos Verdes Peninsula. The surface rupture potential of the onshore Palos Verdes or Cabrillo fault segments is credible, given the geologic and geophysical evidence from offshore characteristics.

## **Earthquake-Induced Ground Failure**

Secondary earthquake hazards such as liquefaction, lateral spreading, dynamic settlement and landsliding are generally associated with relatively high intensities of ground shaking. Liquefaction, lateral spreading and dynamic settlement are associated with shallow ground water conditions, and loose, sandy soils or alluvium.

Liquefaction occurs when soil densifies and settles as a result of the seismic vibrations and resultant extrusion of water-soil slurries. This, in turn, may cause structural foundations to fail, settle below the original grade, and cause overturning of the structure. Most of Rolling Hills Estates is underlain by consolidated bedrock and is not susceptible to liquefaction. The Chandler quarry and some canyons, however, have been infilled with uncompacted artificial or hydraulic fill (refer to Exhibit 8-5). These fills may settle during strong ground shaking. In areas where

perched ground water conditions exist within these fills, liquefaction can occur. Site-specific geotechnical studies are the only practical and reliable way of determining the liquefaction potential of specific sites at risk.

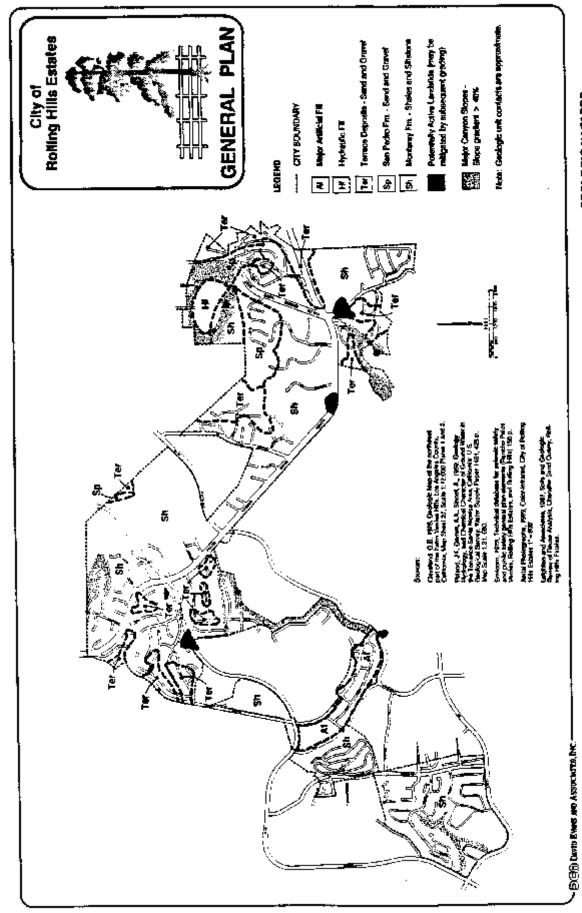
Earthquake induced landsliding and rockfalls are common in areas where steep slopes expose out-of-slope bedding, or where the bedrock is intensely jointed and fractured. Soil slips, or shallow surficial slides, may also occur. These slides may be widespread and could impede the flow of emergency traffic along evacuation routes. In Rolling Hills Estates, out-of-slope road cuts that may pose a rockfall or landslide threat as a result of strong seismic shaking include Crenshaw Boulevard along Agua Negra Canyon, Palos Verdes Drive between George F Canyon to the east and Silver Spur Road to the west, and some sections of Hawthorne Boulevard. Extensive bedrock folding in the peninsula can also result in localized out-of-slope cuts in other areas. Exhibit 8-5 indicates those areas of the City where potentially active landslides are present.

# **Potential Impacts**

Injuries and property damage (structural and nonstructural damage to buildings) from a major earthquake in the region will be due to strong ground motion. Rolling Hills Estates is developed with low and medium density residential areas. Other areas are devoted to low-rise commercial development (Peninsula Center), high-density residential development (condominiums), and isolated research, education and public facilities. Buildings less than 3 stories are likely to be damaged by a nearby earthquake, such as one on the Palos Verdes or Newport-Inglewood fault.

Residential Developments: The wood-frame construction used in residential and commercial developments in the City generally performs well during earthquakes. However, a trend in wood-frame construction in recent years, in particular in housing construction, has been the split level and irregular floor plan. Earthquake intensities of VIII can cause damage to the foundation and wall elements of irregularly shaped structures. Split level houses are susceptible to damage caused by the weakness of the pole platforms or pole structures used to support the structure. Vertical changes in strength are termed "soft-stories" and are also manifested in other types of construction. Single-family residences built before the 1952 Building Code was implemented are more likely to slip off their foundations as a result of strong ground motion associated with near-field earthquakes.

<u>Commercial and Industrial Developments:</u> Buildings using tilt-up concrete walls are found in some commercial developments. Roof collapse has been observed in commercial



GEOLOGIC HAZARDS AND CONSTRAINTS buildings built before 1971 and using this type of construction. Concrete and steel-framed buildings are more earthquake resistant and should be encouraged. Unusual-architectural features such as long spans, minimal amount of interior shear walls, or irregular shapes may be found in commercial development. These features can result in significant damage or collapse during an earthquake.

<u>Critical Facilities:</u> Critical facilities are structures that must remain operational after an earthquake. They include hospitals, fire and, police stations, emergency shelters, evacuation centers and communication centers. *High-occupancy facilities* have the potential for a large number of casualties or crowd control problems. This category includes the Peninsula Center and large multifamily residential projects. *Dependent care facilities* house populations with special evacuation considerations, such as preschools and schools, group care homes, and nursing and convalescent homes. Facilities that pose unacceptable risks to public safety if severely damaged are also of critical concern.

It is important to ensure that critical facilities designed for human occupancy possess no structural weaknesses that can lead to collapse. The State has jurisdictional responsibility to ensure that public schools, such as Rolling Hills High School and Rancho Vista Elementary School, are adequately constructed to seismic standards (Garrison Act, 1969). The County of Los Angeles 5-Year Earthquake Preparedness Plan has a program to ensure continued operation of County Fire Stations in an earthquake, such as Fire Station 106 located on Indian Peak Road.

Site specific structural evaluation is the only reliable method of determining if there are structural design weaknesses in these structures. The County Fire Department is responsible for safety inspections of high-occupancy residential and commercial facilities. These inspections prevent earthquake-induced hazards, as well as improving day-to-day fire safety.

<u>Nonstructural Hazards:</u> Nonstructural damage is perhaps the largest expected source of injury in an earthquake. Buildings with exterior nonstructural hazards, such as cornices and parapets pose hazards to the public if not properly secured. Toppled furniture, book shelves, and interior equipment and decor pose additional hazards. In structures where continued operation is important (critical facilities), special effort is needed to secure needed equipment and emergency generators to prevent damage.

The City of Rolling Hills Estates is located within Seismic Zone 4 specified in the Uniform Building Code. The County of Los Angeles Department of Public Works reviews all projects to

ensure compliance with the existing and regularly amended seismic design provisions of the Building Code. Seismic design provisions for conventional development, such as residential and commercial development, specify that a building not collapse under seismic loading, therefore structural and nonstructural damage cannot be precluded. It is seismic economically infeasible to design earthquake-resistant structures for conventional development. The key is to enforce seismic design provisions with adequate review and inspection to ensure maximum quality construction and optimum design.

Earthquake damage to wood-frame single-family residential structures from near-field sources will be slight to moderate, and limited to walls thrown out of plum, fallen chimneys, and torsional racking of foundation and wall elements. Slippage of structures off their foundations may be prevalent in houses built before 1952.

# **Earthquake Emergency Considerations**

<u>Medical Care:</u> The nearest hospitals to the City are the Torrance Memorial Hospital and Medical Center located at 3330 West Lomita Boulevard in Torrance; Bay Harbor Hospital at 1437 West Lomita Boulevard in Harbor City; and Kaiser Hospital at 1300 West Seventh Street in San Pedro. A maximum credible earthquake on the Newport-Inglewood, the Palos Verdes or Cabrillo faults, could result in up to a 50 percent loss of beds available to patients (Toppozada et al., 1985).

**Fires and Evacuation:** Simultaneous evacuation of high-occupancy structures, such as the stores at the Peninsula .Center, and the occurrence of earthquake-induced fires in the City will tax the Fire Department's manpower resources. Fire hazards in the City are discussed in detail in subsequent subsections of this report.

**Fire Flow:** Water pipelines can be damaged by surface rupture, liquefaction, landslides, or high frequency seismic waves if significant vertical or horizontal displacements of the ground occur (NCEER, 1989). Breaks in the water distribution pipelines can result in significant reductions in water pressure that can slow post-earthquake fire suppression efforts.

<u>Utilities:</u> Rolling Hills Estates is supplied with electrical power by the Southern California Edison who operates the Harbor Generating Station, a 474-megawatt natural gas facility located south of Wilmington. High frequency ground motion characteristic of a nearby earthquake and seismic intensities as low as VII can seriously disable the electrical network system (Hayes, 1987; Toppozada et al., 1988). The downtime of electrical facilities is expected to last no longer than three days. Damage to computer switchboards and power loss will impair emergency communications. Communication centers should have back-up capabilities that rely on battery-

powered radio. Damaged natural gas pipelines and connections may result in service disruption, and in some cases, fire.

<u>Transportation</u>: Earthquake-induced landslides may hinder circulation on Crenshaw Boulevard along Agua Negra Canyon, Palos Verdes Drive North between George F. Canyon to the east and Silver Spur Road to the west, and some sections of Hawthorne Boulevard.

<u>Hazardous Materials:</u> The potential for earthquake-induced hazardous materials accidents inadjacent jurisdictions must be addressed in disaster planning scenarios for the City of Rolling Hills Estates. Hazardous materials issues are discussed later.

#### **GEOLOGIC HAZARDS**

Geologic hazards and geotechnical constraints found in the City of Rolling Hills Estates are tied to the structural characteristics of the bedrock and the overlying soil mantle. The Palos Verdes Peninsula is predominantly underlain by a sequence of folded sedimentary bedrock. Overlying the bedrock are a series of elevated "beach" terraces, sand and gravel formations created during the emergence of the peninsula landform over the last 1.5 million years. These deposits lend themselves in varying degrees to landsliding, debris and mudflows, settlement, expansive soils, and/or susceptibility to erosion.

# **Landslides and Slope Instability**

The majority of the City is underlain by shale and siltstone units of the Monterey Formation (Altamira Shale; the Valmonte Diatomite and Malaga Mudstone are confined to north of Palos Verdes Drive). These interbedded units have planes of weakness that are conducive to landsliding and slope instability, characteristic of the Palos Verdes Peninsula. Yet active landslides are not numerous in the City, in contrast to other areas of the peninsula where massive landslides, such as the Portuguese Bend and Flying Triangle, pose severe geologic hazards. Nevertheless, small landslides in the canyon areas and one large postulated landslide complex northeast of the Peninsula Center area exist.

Slope modification during grading can render slopes unstable. Slope instability occurs when bedding planes intersect the slope face of either natural slopes or designed cut slopes. The natural orientation of major slopes in the City are along northeast-southwest trending canyons. Bedding is generally inclined to the north on the northerly flanks of the City and inclined to the south on the southerly side. Bedding plane orientations, however, are quite variable throughout the City, indicating out-slope-bedding conditions may occur locally. Site specific investigations are necessary to determine potential slope instability problems at specific sites (tract or parcel size).

Exhibit 8-5 shows the distribution of probable landslides in the City, some of which may have been subsequently verified and stabilized through grading activity. Landslides are considered "potentially active", meaning they could be reactivated in the future, either by excessive rainfall, introduction of artificial water in the slope (landscaping irrigation/broken water or sewage lines), or improper site design or grading practices. Grading activities must consider these geologic constraints as a condition of project approval. The County of Los Angeles Department of Public Works acts as reviewer for the City to ensure all potential geologic problems are addressed.

<u>Silver Spur Landslide Complex.</u> The northwest-southeast trending valley along Silver Spur Road could be a pull-apart scarp within a postulated "Silver Spur landslide" complex (Envicom, 1975). Robert Stone and Associates (1985) stated that this landslide complex is probably several square miles in area and an ancient analog of the present Portuguese Bend Landslide. Other engineering geologists believe the presence of known or inferred faults trending subparallel to the graben (valley) support a tectonic (fault-related) origin. Indeed, the Silver Spur graben parallels the Cabrillo fault, and small faults are mapped bounding the northern and southern walls of the graben (Cleveland, 1976).

The size and geomorphic expression of the Silver Spur graben (outlined as an area of major artificial fill) implies large-scale extensional faulting and very high fault slip rates; something which is not observed on the Cabrillo fault. If movement along the Cabrillo fault is not associated with origins of the graben feature, a landslide origin best fits the evidence to date. A landslide complex model suggests that a shallow northward-dipping "potentially active" slip surface underlies a major portion of the residential area northeast of the Peninsula Center. Although its location is highly conjectural, the postulated Silver Spur landslide complex could extend as far northeast as Palos Verdes Drive North and at least as far east as Crenshaw Boulevard.

**Earthquake-Induced Landsliding:** Earthquake ground shaking worsens existing unstable slope conditions. If engineered slopes are designed properly, they will perform well under intense ground shaking. Typical earthquake-induced landslides in bedrock and in terrain similar to Rolling Hills Estates include shallow slumps and slides. These are commonly associated with steep road cuts and natural slopes. The 1989 Loma Prieta Earthquake showed that reactivation of larger, dormant, deep-seated landslides along weak bedding is possible, not dissimilar to the conditions found in the City created by the interbedded Monterey Formation.

**Storm-Induced Landsliding and Erosion:** Heavy rainfall often triggers surficial sliding (debris flows and mudflows) along the sides of canyons and on steep slopes. The San Pedro Formation is an unconsolidated marine sand deposit found on the northern flank of the City. This formation

is highly susceptible to erosion on the hillsides if they are not properly planted. Current grading codes provide protection against mudflows and erosion, including provisions for planted and maintained slopes, retaining walls, drainage devices, and debris basins. Older developed hillside areas of the City, most notably areas developed before 1963, may not have benefitted from such protection, and consequently, they stand a greater likelihood of experiencing storm damage.

# **Geotechnical Constraints**

One of the most visible geotechnical constraints in the City is the presence of semi-controlled, man-made fills in the northeast portion of the City. Quarry operations have resulted in various types and quantities of fill material within and adjacent to the Chandler property. Hydraulic fills and desalting basins of various sizes and depths occur both on and off site (Leighton and Associates, 1981). The delineation of hydraulic fills in Exhibit 8-4 is approximate in nature, and small pockets may occur outside of the Chandler Quarry site. Hydraulic fills in the area are extremely susceptible to earthquake-induced ground failure.

The Chandler Quarry site is used as a landfill at the eastern and northern flanks of the quarry. Large concrete blocks, asphalt and debris (Class III), and hazardous materials (Class I and II) have been placed in the pit. The primary geotechnical constraint of semi-controlled landfill is settlement, however, ground water contamination is a major concern. The northern half of the quarry, underlain by the San Pedro Formation, is in hydraulic continuity with the groundwater aquifer in the Los Angeles Basin. Hazardous materials issues at the landfill will be discussed in more detail.

Diablo and Altamont soils and various thicknesses of expansive slope wash (colluvium) are found at the top of terraces, and along canyon walls and bottoms. They are characteristically dark clay, with a high shrink-swell potential. Modern soil engineering procedures coupled with present-day foundation designs can effectively mitigate expansive soils, but soil moisture fluctuations should still be avoided.

## FLOOD AND INUNDATION HAZARDS

Small-scale flooding occurs when storm drain systems become overburdened during strong winter storms. They can damage property and hinder emergency activities, such as fire department access to fire hydrants or evacuation.

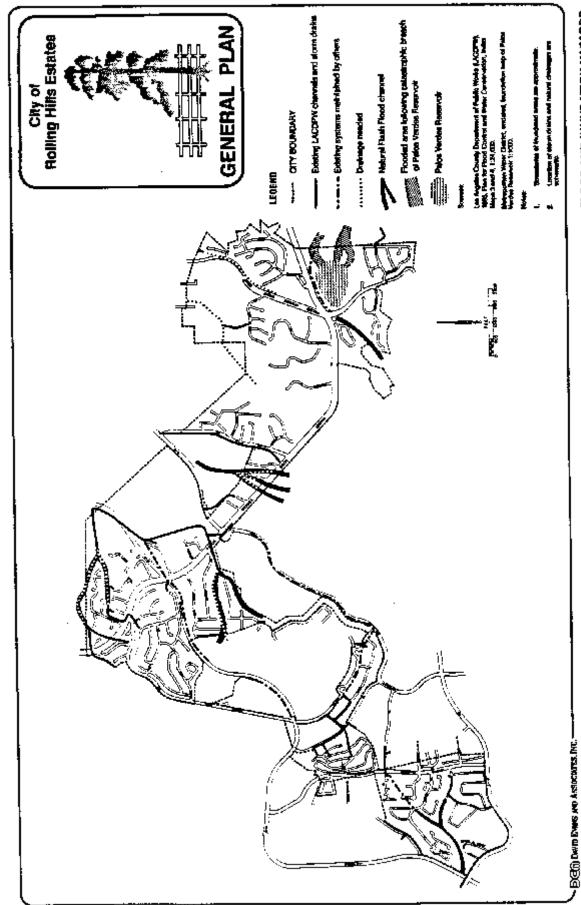
## **Dam Inundation**

The Palos Verdes Reservoir is located near the eastern limit of the City of Rolling Hills Estates. The reservoir is owned by the Metropolitan Water District (MWD). It is an earthen fill dam built in 1939 with a capacity of 1,100 acre-feet. The reservoir supplies water to the California Water Service distribution network in the peninsula. The MWD Safety of Dams Section maintains continuous surveillance of the reservoir, including live-in personnel at the facility. The MWD also monitors piezometers in the embankment to warn of increases in seepage, a critical precursor that can undermine the foundation and threaten the stability of the dam. The piezometers are connected to an automatic alarm system. As required by State law, MWD prepared maps showing the potential flood limits and maintains emergency plans in the remote possibility of dam failure. The potential inundation area is shown in Exhibit 8-6.

The California Division of Safety of Dams reviews MWD reports detailing repairs, maintenance, and monitoring operations at the reservoir and inspects the facility biannually. As of 1991, the facility is in conformance with State safety standards. The site is monitored by strong motion instrumentation and, according to current reports, will be able to withstand a maximum credible earthquake on the Palos Verdes fault (George Barber, 1990, MWD Safety of Dams). Dam failure is not a severe safety threat to the City because only open space and a parking lot are in the inundation path. There are no residential developments and main thoroughfares in the Rolling Hills Estates that area within the potential inundation area of !he reservoir. San Pedro would be most impacted by failure of the reservoir. In the event of dam failure, the facility's emergency plans include cooperation with the Department of Water and Power for emergency dewatering of the reservoir. The Department of Water and Power controls the main inlet and outlet pipeline feeders from the reservoir.

## **Storm Flooding**

There are no widespread 100 year flood problems in the City of Rolling Hills Estates. Flash flooding does not pose a direct threat to public safety in canyons as development is not permitted in these areas. The City of Rolling Hills Estates has been registered in the National Flood Insurance Program (NFIP) since 1979. The Federal Emergency Management Agency, the administering agency for the insurance program, indicates that there are no widespread flood problems in the City, therefore 100-year flood maps are not available nor required. Participation in the program ensures coverage from any "flash flood", "mudflow", or "earth movement", so long as it can be directly tied to heavy rainfall caused by seasonal conditions.



FLOOD AND INUNDATION HAZARDS

In compliance with the National Flood Insurance Program, Rolling Hills Estates administers a flood management ordinance (Ordinance 299) whereby conditions are defined in order to develop in areas subject to flood hazard. In practice, however, canyon areas are the only natural flood hazard and they are generally designated as open space. Storm-induced flood problems in the City, as defined by the NFIP, would include flash floods in the canyon areas, saturated mudflows on the hillsides, and shallow flooding in streets and residences associated with poor storm drainage. Due to the small size of the canyon watersheds in the City, most flash floods in the canyons are short-lived. Exhibit 8-6 shows the location of the major flood prone canyons in the City.

**Localized Flooding.** The previous chapter noted the importance of adequate drainage on developed hillside lots. Channeling storm runoff away from the slopes and into storm drains prevent erosion and minimizes the chance of shallow mudflows on graded slopes. If improperly maintained, private storm drain systems can overflow and channel sheet flow or mud into a residence. Residential drainage infrastructure often ties into larger storm drain systems where they empty into natural drainage such as canyon areas. Paved concrete channels or flood velocity reduction structures are sometimes necessary in natural drainage to prevent erosion caused by the channeled runoff. Erosion is not only unsightly, but can undermine adjacent slopes and make them unstable.

<u>County Storm Drain System.</u>. The Los Angeles County Department of Public Works maintains the largest system of storm drains in the City of Rolling Hills Estates . Storm drains are designed to convey ten year frequency storm flows, floods that are expected to be equaled or exceeded once every ten years. System performance is reviewed on a similar time scale. Storm drainage requirements are designed to prevent floods from rising above the curbline and beyond the right-of-way.

Exhibit 8-6 shows areas where the County Public Works has identified future storm drain needs in order to prevent: 1) flooding from rising outside the right-of-way and into private property or 2) environmental impacts caused by the over capacity of existing natural drainage. Curbline inundation is not a direct threat to public safety, however, if access to a fire hydrant is hindered by street inundation, fire fighting capability can be indirectly affected. Street circulation is also hampered by street inundation.

Sheet flow along local or private roads in the City is directed to storm drains or catchment basins. Minor flooding along such routes is tolerated until a flood or safety issue is posed. If system performance is substandard, either as indicated by County studies or citizen complaint, the City can contract with the County to correct the problem.

New development or expansion of existing developments adjacent to the canyons increase runoff and erosion in the drainage. Environmental damage, and in some areas, slope instability may result. The impact on canyon drainage should be evaluated for the installation of adequate connectors to existing Los Angeles County storm drain systems.

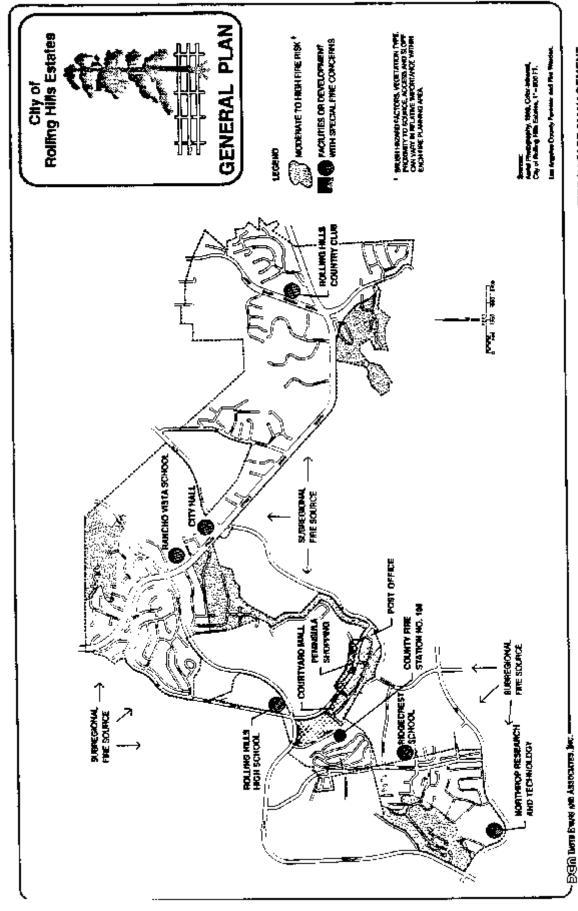
Proper drainage is necessary to ensure adequate access for emergency response, fire fighting, or evacuation activities. The City should encourage correction of sheet flow or concentrated channel flow problems along existing single access routes or in areas where fire hydrants are in a drainage deficient area. For new development, Los Angeles County Fire Code Standard No.10.207(A) requires special drains in the vicinity of fire hydrants and states that private access roads must be designed to withstand (not undermine) a capital flood (flood capable of occurring on a roughly 250-year flood return interval).

#### FIRE HAZARDS

Rolling Hills Estates is predominantly made up of residential suburban development with less extensive areas devoted to low-rise commercial development (Peninsula Center), high density residential development (condominiums), and various isolated public and private facilities. Some developments lie adjacent to open space and canyon areas containing *chamise and coastal chaparral and coastal sage*, plant communities which are highly combustible due to volatile oils found within the plant tissues. The most extensive plant communities in the City, however, consist of less volatile grass and shrubs and planted landscaping. Given the physical and urban setting of the City, fires may start inside a building, or spread from adjacent brush and chaparral areas. Structural and brush fires are most often caused by accidental and deliberate human means.

#### **Brush Fire**

Certain areas of the City are more susceptible to brush fires than others. Exhibit 8-7 shows the relative fire risk based on the location and proximity of development to dense areas of volatile vegetation, relative access by road, and steepness of the terrain. Wind conditions is a direct variable and are assumed to be low. If fire occurs during Santa Ana winds, "branding" of wind-transported embers a mile or more from the source of fire can ignite combustible roofs and awnings. Multiple ignitions can tax normal fire fighting resources and increase response times to individual fires. A reconnaissance survey of roofs in the City indicates that wood-shake shingle construction is prevalent. Combined with the potential for branding during Santa Ana winds, many areas of the City would be vulnerable to fire under extraordinary circumstances. Branding also makes the City vulnerable to fires from outside the City.



FIRE HAZARD MANAGEMENT

# **Earthquake-Induced Fire**

The principal causes of earthquake-related fires include open flames, electrical malfunctions, gas leaks, and chemical spills. Commonly affected are unanchored gas heaters or gas-fired hot water heaters, appliances which tend to tip over and damage rigid gas line connections during strong ground shaking. Damaged gas line connections, overturned appliances, and damaged electrical circuitry could be the most likely cause of earthquake-induced fires in the City.

The risk of fire from a damaged gas supply system can be considered low in Rolling Hills Estates. The only segments of the system at risk are those in areas of potentially severe ground failure and surface rupture, areas largely confined to the northeastern portion of the City. The Southern California Gas Company is equipped to isolate and shut off sections of severely damaged supply lines. Downed power lines from an earthquake and strong winds can start brush fires. To prevent such an occurrence, power lines are designed to automatically de-energize if there is a break in the system and vegetation is cleared under transmission routes.

# Fire Protection and Life Saving Services

The City of Rolling Hills Estates is located in Division I of the Consolidated County Fire Protection District. County Fire Station 106 (413 Indian Hill Road) provides fire suppression services for the City, and under normal circumstances, is able to respond to an emergency or fire anywhere in the City in an average response of less than 5 minutes. Five other stations in the area are also able to provide prompt additional resources if needed. The closest fire suppression and emergency resources available to the City include:

**Station No. 106:** This facility contains one engine company, one truck company, one paramedic unit, and a Battalion Chief.

<u>Subregional Stations</u>: Subregional stations that can serve the planning area include stations in Lomita (one station), Palos Verdes Estates (one station), Rancho Palos Verdes (two stations) and Rolling Hills (one station). Any additional resources from the County Fire Department are available if required.

In order to maintain an adequate level of fire protection for buildings located within areas under contract for Los Angeles County Fire Department services, minimum safety standards for fire flow and water supply, road width and access, and turning radius for fire apparatus are required. Because the City is supported by a local fire company with adequate response time and has a

water distribution network with fire hydrants and access for fire vehicles, the City is designated a County Fire Zone 3. Fire Zone 3 is a fire code designation given to unincorporated areas with similar attributes. This protection merits the Insurance Service Office (ISO) fire risk classification(3), indicating an acceptable level of fire protection.

Fire flow is the delivery rate of water necessary to halt and reverse the spread of fire. The County Fire Protection Engineering Unit determines specific peak water flow requirements based on building height, occupancy, construction, contents, and other factors. Table 8-3 shows a range of fire flows mandated by the County for selected types of development found in Rolling Hills Estates (Fire Zone 3). Fire Prevention Regulation No. 8 provides details regarding hydrant spacing, duration of applied fire flow, and special regulation involving additional stories, mid-rise (3-stories), high-rise (5-stories), high hazard occupancies and many other variations of fire flow requirements.

Potential losses in water pressure due to breaks in the water distribution system can be caused by corrosion of cast-iron pipelines, excavation, and earthquake related ground failure. Pipelines must be protected in areas of potential liquefaction and landslides. Required fire flow tests are conducted by the County Fire Department and the local water company to ensure adequate fire flow.

TABLE 8-3 SELECTED MINIMUM FIRE FLOW AND ACCESS STANDARDS					
Occupancies	Fire Flow (gpm)	Road Width <sup>2, 3</sup>	Access <sup>4</sup> (Feet)	Turning Radius Feet	
Single-Family (Fire Zone 4)	1000-1250	20-26	150	32	
Single-Family (Fire Zone 3)	750-1250	20-26	150	32	
Two-Family (Duplex)	1500	26-36	150	32	
Mobile Home (Fire Zone 4)	1250	26-36	150	32	
Multi-Family (Apartment, Condominium and Hotel)	1000-5000	26-36	150	32	

TABLE 8-3 SELECTED MINIMUM FIRE FLOW AND ACCESS STANDARDS						
Occupancies	Fire Flow (gpm)	Road Width <sup>2,3</sup>	Access <sup>4</sup> (Feet)	Turning Radius Feet		
Schools	1000-5000	26-36	150	32		
Commercial and Industrial	1000-5000	26-42	150	32		
High-Rise (5-stories or 75 feet)	5000	N/A	N/A	32		

- 1) Fire flow increases with building size (square feet) and/or lot acreage. 20 psi and 600 ft. hydrant spacing is required for single-family dwellings. 20 psi and 300 ft. hydrant spacing is required for all other occupancies.
- 2 Road width increases where parallel parking allowances, hydrant requirements, or aerial fire suppression requirements, or serial fire suppression requirements indicate the need.
- 3) Minimum 20 feet private road width is permitted only if life safety is not jeopardized, topography or lot shape/dimensions are constraints, and the Fire Department grants discretionary approval.
- 4) A paved access is required if any portion of the first floor building exterior is more than 150 ft. from a public vehicle access (private driveway, bridge, alley).

Sources: Los Angeles County Fire Department Fire Code Standards 10.207 (A) and (B) and Fire Prevention Regulation No. 8, Vol. 7, Chap. 1, Subject 8 - Fire Flow and Hydrant Standards.

Minimum road width, access, and turning radius standards are established to provide adequate access to structures during fire suppression operations. Such standards are geared for private access roads including driveways, bridges, and alleys and restricted access roads designed solely for fire department apparatus. The majority of streets and arteries in Rolling Hills Estates are constructed to County Road Department standards and provide acceptable vehicular access. Private roads, however, are commonly used for public access and fire emergency access and must be reviewed for minimum access requirements.

Table 8-3 shows a range of road widths for certain types of development. A twenty-six foot road width is required at fire hydrant locations for a linear distance of 25 feet along the street on both sides of the hydrant. Turning radii on cul-de-sacs or street curves are required for all streets in the City. Because insufficient turning radii can restrict emergency access, minimum turning radii standards for emergency access roads are 32 feet. Forty feet inside and 50 feet outside radii are common in most developments.

Brush management of vegetation adjacent to buildings is an important element in fire prevention. Minimum requirements include managing combustible growth within 100 feet of structures, including clearance of hazardous flammable vegetation 30 feet around the building perimeter. Additional standards and regulations are found in Chapter 27 of the Los Angeles County Fire Code. Fire hazard reduction guidelines can also be found in "Hillside Design Guidelines", a County Regional Planning Manual.

## **Current Standards and Regulations**

The Los Angeles County Fire Department conducts annual fire prevention and brush inspections in the City. Continued emphasis on public awareness and education concerning brush and earthquake-induced fire during such inspections is warranted. Advocation of smoke alarms and other fire protection and/or risk reduction devices is also appropriate.

Rolling Hills Estates currently enforces a *Class B Roofing Ordinance* for new development. As defined in the *1988 Uniform Building Code*, Class B roofs are pressure treated, wood-shake shingles. Class A roofs are chemically-treated, ceramic and steel-covered wood tiles. There are a substantial number of single-family residences in Rolling Hills Estates with wood shingle/non-rated roofing materials which could benefit from the conversion to Class B roofing material.

The National Fire Protection Association (NFPA) publishes standards for secondary water supply systems which may be required in areas where: a) pipeline damage can reduce available fire flow, b) municipal water sources are not available to isolated structures, and c) where the fire jurisdiction deems it's necessary to ensure fire suppression capability. Additional fire protection is also warranted by the County Fire Code if there is restricted access. Provisions include: on site secondary supply of water for emergency fire flow, including emergency pumping apparatus for swimming pools, etc. (NFPA Standard 1231); fire resistant construction; interior automatic fire sprinkler system; and additional brush clearance. Public assembly facilities, high occupancy facilities, and facilities housing immobile populations (schools, nursing care, convalescent home) in the City require special emergency needs in addition to fire suppression. High occupancy facilities (50 persons or more), or other occupancies noted of special concern by the County Fire Department, include Rolling Hills High School, Rancho Vista School, Rolling Hills Country Club, City Hall, Courtyard Mall, Peninsula Shopping Center, and Northrop Research and Technology (Exhibit 8-7). Fire drills and public education programs are needed to facilitate rescue operations and fire containment.

NFPA (1231) lists a variety of "High Hazard" occupancies with contents that create intense fires; examples are department stores, barns and stables, exhibition halls and auditoriums. Los Angeles County now requires sprinkler systems for most high occupancy and high hazard structures.

Retroactive sprinkler installation for critical facilities not covered by current regulations is a significant opportunity to increase public safety.

Supplementary gravity-fed municipal water tanks and distribution systems and fire flow testing are necessary elements of an emergency fire flow program. Mutual aid agreements involving fuel management, suppression assistance, logistical support, and an efficient fire reporting system are provided through the Consolidated County Fire Protection District.

Erosion can result from improper brush management. "Fire Hazard vs. Erosion Control: A Homeowner Guide" stresses substitution of existing vegetation with fire retardant plants and presents guidelines for managing fuel loading without increasing erosion potential.

#### **HAZARDOUS MATERIALS**

A hazardous material is a substance that is toxic, ignitable or flammable, or reactive and/or corrosive. An extremely hazardous material is defined as a substance that shows high acute or chronic toxicity, carcinogenicity, bioaccumulative properties, persistence in the environment, or is water reactive. The primary concern associated with the release of a hazardous material is the short and long term effects that exposure to a hazardous substance may have on the public. This is particularly true when a toxic gas is involved, since a toxic plume is more difficult to contain than a solid or liquid spill, and a gas can impact a larger segment of the population in a shorter time span.

All businesses that handle more than a specified amount of hazardous materials are required by both the Federal and State governments to submit a business plan to their local administering agency (the reportable quantities are 50 or more gallons of a liquid, 500 pounds or more or a solid, or 200 cubic feet or more of a gas at standard temperature and pressure; quantities for acutely hazardous materials vary according to the substance). In Rolling Hills Estates, the administering agency is the Los Angeles County Fire Department, Hazardous Materials Section. Every handler is required to submit a business plan to the Fire Department every two years, and an inventory of hazardous substances on a yearly basis. Registration forms for acutely hazardous materials are to be submitted on a yearly basis too (Greg Vital, 1991 personal communication).

The Los Angeles County Fire Department inspects the businesses that have submitted business plans at least once every two years to validate the accuracy of their plans. It is the responsibility of the handlers to submit any changes (such as types or quantities of hazardous materials used, ownership, etc.) to the Fire Department. On July 1, 1991, the Hazardous Materials Control Program staff and resources of the County Department of Health Services was transferred to the Los Angeles County Fire Department.

One of the best ways to reduce the impact of a hazardous material release is through regulation governing the storage, use and manufacture of hazardous materials. Several regulations have been implemented to address the issue of hazardous substances; individual cities have the right to develop more stringent requirements than those established by the State.

Most chemicals have their own unique physical and chemical characteristics and an acceptable mitigation procedure for one chemical may be totally inadequate for another. Therefore, business plans should contain, for each hazardous and extremely hazardous material handled, a description of the physical and chemical properties of the material, and of the symptoms that result from contact with the material. The plan should also have a site map that shows where each hazardous material is stored and handled and where emergency response equipment is located, and evacuation plans and procedures. Business plans are designed to be used by the Fire Department during a hazardous materials incident to allow for quick and accurate evaluation of each situation for appropriate response. Employees of facilities that use, store or manufacture hazardous materials should be aware of where a copy of the business plan is kept, and of how the plan is put into operation if a hazardous material accident occurs.

Although significant concentrations of hazardous materials, at levels for which a business plan is required, are generally associated with manufacturing and industrial areas, hazardous materials are also used and stored in commercial and residential areas. Most of Rolling Hills Estates is currently zoned for residential use. One main commercial area exists in the City, along Silver Spur Road between Hawthorne and Crenshaw Boulevards. This area includes retail clothing and specialty stores, grocery stores, banks, restaurants, gasoline stations and other service businesses. Fifteen handlers of hazardous materials have been identified in Rolling Hills Estates, ten of which are located in the City's general commercial zone. The fifteen handlers identified in Rolling Hills Estates are listed in Table 8-4. Because there are no heavy manufacturing facilities in Rolling Hills Estates, the potential of a hazardous material accident occurring within the City is unlikely.

A review of the Federal CERCLIS list, Federal and State Superfund sites, the State ASPIS and Cortese lists, and the *Regional Water Quality Control Board* list of Leaking Underground Fuel Tanks revealed that three leaking underground fuel tank sites and one State Superfund site (the Palos Verdes Landfill) have been reported in the City (see Table 8-4).

TABLE 8-4 REPORT HANDLERS OF HAZARDOUS AND ACUTELY HAZARDOUS MATERIALS IN ROLLING HILLS ESTATES				
No.	Facility	Address	Status	
1	Robing Hills Country Day School Northrop Research and Technology	26444 Crenshaw Boulevard		
2	Ice Capades Chalet Palos Verdes International Auto	6101 Crest Road		
3	Center	550 Deep Valley Drive		
4	Courtyard Mall	627 Deep Valley Drive		
5		550 Deep Valley Drive		
6	Arco Station No. 3005	27301 Hawthorne Boulevard	preliminary site assessment underway	
7	Los Angeles County Fire Station No. 106	413 Indian Peak Road	,	
8	Shell Peninsula	27505 Indian Peak Road		
9	Jack Kramer Tennis Club	11 Montecillo Drive		
10	Chandler's Sand and Gravel	26311 Narbonne		
11	Metropolitan Water District	2300 Palos Verdes Dr. North		
12	One Hour Moto Photo	893 Silver Spur Road	preliminary site assessment underway	
13	Charles B. Webster III	449 Silver Spur Road	preliminary site assessment	
14	Arco Station No. 6087	828 Silver Spur Road	work plan requested	
15	Glendale Federal Property	601 Silver Spur Road		

List of handlers compiled from the list of businesses supplying business plans to the Los Angeles County Fire Department (1-13), and from the Regional Water Quality Control Board List of Underground Leaking Tanks (14-15). Information regarding leaking underground tanks compiled from the April 1990 list, prepared by the Regional Water Quality Control Board.

<u>Palos Verdes Landfill.</u> The Palos Verdes Landfill, located between Hawthorne and Crenshaw at north City boundary, is considered a State Superfund Site under the State Expenditure Plan. The landfill is approximately 291 acres in area. Non-hazardous wastes were accepted at the landfill between 1952 and 1980. In addition, both Class I (solid) and Class II (liquid) unknown waste materials which could possible be considered as hazardous were accepted during its

operation. Hazardous wastes/materials disposed at the landfill included acid and alkaline wastes, pesticides, solvents, tetraethyl lead, sludge, hazardous tank bottoms, oily wastes and drilling mud. These wastes were disposed into injection wells, disposal pits and drums.

In the mid-1980's, groundwater contamination was detected beneath the landfill (the groundwater under the landfill is not used as a drinking water source). In 1986, the Los Angeles County Sanitation District constructed a subsurface barrier at the northern boundary of the main landfill to contain the northward migration of contaminated groundwater. Some of the sands underlying the landfill have the potential of promoting hydraulic conductivity with aquifers underlying the Los Angeles Basin (east of the Palos Verdes Peninsula). The County Sanitation District began a remediation plan by which water pumped from under the landfill is air stripped to remove some of the contaminants that occur in a gaseous phase. These off gases are burned, together with other gases generated by the landfill, in a gas-to-energy facility on the northwestern section of the landfill.

Additional remediation actions are expected to be implemented as a result of a site characterization and feasibility study scheduled for completion in 1996. In the meantime, the Los Angeles County Sanitation District and the State Department of Health Services address all health and safety concerns as they are identified.

For future development on the landfill site, the lead agency responsible for overseeing remediation of the site (currently the Los Angeles County Sanitation District) will probably require a sign off on the cleanup prior to releasing the land for development.

Northrop Research and Technology Facility. The Northrop Facility located at 6101 Crest Road is one of the five handlers of hazardous materials not located within the commercial zone of the City. Although there is always the potential for an unauthorized release of hazardous substances, the impact of such a release on the rest of the City may be limited. The largest concern with the research facility is the future redevelopment of the site. Improper demolition of asbestos-containing buildings may result in the release of asbestos into the air. Any building constructed before 1979 may have asbestos-containing materials in its floor tiles, roofing, walls, insulation and other construction materials. Some buildings built in the 1980's may still test positive for asbestos. Asbestos, a fibrous mineral that has been linked to lung cancer, is generally released into the air when an otherwise safe, asbestos-containing material is crushed or broken.

## **Hazardous Materials Incidence Response**

The County of Los Angeles Fire Department is responsible for responding to a hazardous material release incident in the City of Rolling Hills Estates. The Fire Department has three hazardous

materials squads; the one closest to Rolling Hills Estates is located in the unincorporated area near the City of Carson. The Fire Department's Health Hazard Response Team (previously from the County Health Department) will also respond to ensure the appropriate dean-up, investigation, and removal. The County follows the procedures set in the Multi-Hazard Functional Plan for emergency operations revised in 1987. No incident of a hazardous material release requiring a response by a hazardous materials squad has occurred in the City in the last two years (Jay Corbett, 1991 personal communication).

Releases of hazardous materials can occur during a natural disaster, such as an earthquake. Improperly stored containers of hazardous substances may overturn or break, pipelines may rupture, storage tanks may fail. Containers may explode if subject to high temperatures, such as those generated by a fire. If two or more chemicals which are reactive when combined come in contact as a result of a spill, the hazard may be compounded. The 1988 Uniform Fire Code includes a set of criteria, designed to minimize the risk of an accident, to be followed when storing, using or transporting hazardous materials. These requirements include secondary containment of substances, segregation of chemicals to reduce reactivity during a release, sprinkler and alarm systems, monitoring programs, venting and auto shutoff equipment, and treatment requirements for toxic gas releases.

In Rolling Hills Estates, most businesses that handle hazardous and/or acutely hazardous substances in quantities above the reportable limits are located in the commercial area along Silver Spur Road, Deep Valley Drive and Indian Peak Road (see Table 8-4). These businesses are located two, and often, less than one mile from Los Angeles County Fire Department Station No. 106 at 413 Indian Peak Road. The short distance between these facilities and the Fire Department means that firemen will, in general, be able to respond to an incident in less than their 2.5 to 3 minute average emergency response time.

Several large refineries, manufacturing facilities and military stations are located within ten miles from the City. These facilities carry the potential of causing a hazardous materials release incident that may impact the City. They include the U.S. Naval Reservation east of the City, the Torrance Municipal Airport and the U.S. military reservation to the north, the refineries in Wilmington and Torrance to the northeast, and the San Pedro Hill Air Force Station to the east. Military facilities generally store and handle fuel and other hazardous substances that, if spilled or released, have the potential of releasing toxic clouds that could impact neighboring areas. The California Highway Patrol is in charge of spills that occur in freeways, with local sheriffs and police departments responsible for additional enforcement and routing assistance.

Hazardous materials stored in oil refineries have the potential for toxic fumes if accidentally released during an earthquake or fire (Toppozada et al., 1988). The Union Oil Refinery in Wilmington is approximately one mile east of Rolling Hills Estates. Other refineries within five

miles of the City include the Mobil Oil Corporation refinery in Torrance, and the Shell Oil Co., Atlantic Richfield and Texaco, Inc. refineries in Wilmington. Whether a toxic fume released by any of these facilities would impact Rolling Hills Estates is in part dependent on wind direction and other climatological factors.

Evacuation and Disaster Routes. Evacuation involves relocation of occupants from buildings to ensure public safety to guidance of residents of an entire neighborhood away from hazardous areas. Disaster routes function as primary thoroughfares for movement of emergency response traffic, such as fire control. Disaster routing and evacuation are similar, in that road blockage or traffic jams can reduce response times. They are different in that evacuation activities are controlled by particular situations, and often require improvisation.

Storms, fire, and earthquakes can restrict access to residential neighborhoods with only single routes of entry. Road blockage could be in the form of slope failure, road wash out or local inundation. Evacuation is complicated during hazardous materials incidences because of the undetectable nature of some toxic chemicals, and because the movement of gas plumes cannot be readily predicted. Industrial centers to the north and east pose the greatest risk during Santa Ana wind conditions, when inland winds are directed toward the City.